



Raven iDEN for TELUS

User Guide

20070914
Rev 3.0B

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Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless AirLink Raven are used in a normal manner with a well-constructed network, the Sierra Wireless AirLink Raven should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless AirLink Raven, or for failure of the Sierra Wireless AirLink Raven to transmit or receive such data.

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5,515,013	5,629,960	5,845,216	5,847,553	5,878,234
5,890,057	5,929,815	6,169,884	6,191,741	6,199,168
6,339,405	6,359,591	6,400,336	6,516,204	6,561,851
6,643,501	6,653,979	6,697,030	6,785,830	6,845,249
6,847,830	6,876,697	6,879,585	6,886,049	6,968,171
6,985,757	7,023,878	7,053,843	7,106,569	7,145,267
7,200,512	D442,170	D459,303		

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Contact Information

For support assistance for SouthernLINC and Private iDEN Sierra Wireless AirLink modems, please contact Digital Highway first.

Support Desk:	Phone:	1-877-524-0430
	Hours:	8:00 AM to 5:00 PM Eastern Time, Monday to Friday, except US Holidays
	E-mail:	support@digital-hwy.com
Sales Desk:	E-mail:	sales@digital-hwy.com
Post:	Digital Highway 175 Hill Brady Road Battle Creek, Mi USA 49037	
Web:	www.digital-hwy.com	

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	E-mail:	MobileandM2Msales@sierrawireless.com
Post:	Sierra Wireless America 3159 Corporate Place Hayward, CA USA 94545 Sierra Wireless 13811 Wireless Way Richmond, BC Canada V6V 3A4	
Fax:	1-510-781-4299 1-604-231-1109	
Web:	www.sierrawireless.com	

Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, trouble-shooting tips, and press releases:

www.sierrawireless.com

Revision History

Revision number	Release date	Changes
1.x	2003-2005	AirLink Communications documentation - CDPD, CDMA, and GPRS.
2.x	Q2: 2005-Q2: 2007	AirLink Communications documentation - CDMA, EV-DO, EDGE, and HSDPA.
3.0	in draft	Converted documentation from AirLink Communications documentation format into Sierra Wireless documentation format. Phase II of the conversion completed. Raven modem line documentation is revised.

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>> 1: Introduction to the Raven

- ALEOS™
- AceWare™
- Connecting to the TELUS Network
- iDEN Communication

Powered by ALEOS™, Raven modems are designed to maintain a reliable, consistent network connection. With a serial interface and a vast library of machine protocols, the Raven is a workhorse for industrial and mission critical applications. Class I Division 2 certified as nonincendive equipment, the Raven Series is ideally suited for use in hazardous environments.

Key applications include utilities, manufacturing, automation, oil and gas, SCADA, telemetry, Homeland Security and asset monitoring.



POWERED BY: ALEOS

Figure 1-1: Sierra Wireless AirLink Raven

ALEOS™

ALEOS, the embedded core technology of the Sierra Wireless AirLink products simplifies installation, operation and maintenance of any solution, and provides an always-on, always-aware intelligent connection for mission-critical applications.

ALEOS enables:

- Persistent Network Connectivity
- Over-The-Air (OTA) Upgrades
- Wireless Optimized TCP/IP
- Real-Time Notification
- Extensive Machine Protocols
- Packet Level Diagnostics
- Device Management & Control

- Protocol Spoofing



Figure 1-2: Powered by ALEOS

AceWare™

A wireless solution is not complete until you have software tools to manage the devices monitoring your valuable equipment. AceWare™ is the device management and monitoring application suite for Sierra Wireless AirLink products powered by ALEOS.

- AceManager
- AceNet
- AceView
- Modem Doctor

These modem utilities, except AceNet, are free of charge to those who own Sierra Wireless AirLink modems. You can download the applications and their user guides from the Sierra Wireless AirLink Solutions web site: <http://www.sierrawireless.com/support>. Contact your dealer or Sierra Wireless representative for information on AceNet.

Note: AceView, AceManager, and AceNet require the Microsoft .NET Framework v. 1.1 and Microsoft Windows 98, Windows 2000, Windows XP, or later. You can obtain the Microsoft .NET Framework from Microsoft at: <http://www.microsoft.com/>.

AceManager

AceManager, the AceWare remote configuration and monitoring tool, simplifies deployment and provides extensive monitoring, control and management capabilities. AceManager gives you the power to monitor and control your Sierra Wireless AirLink communications platforms in real-time.

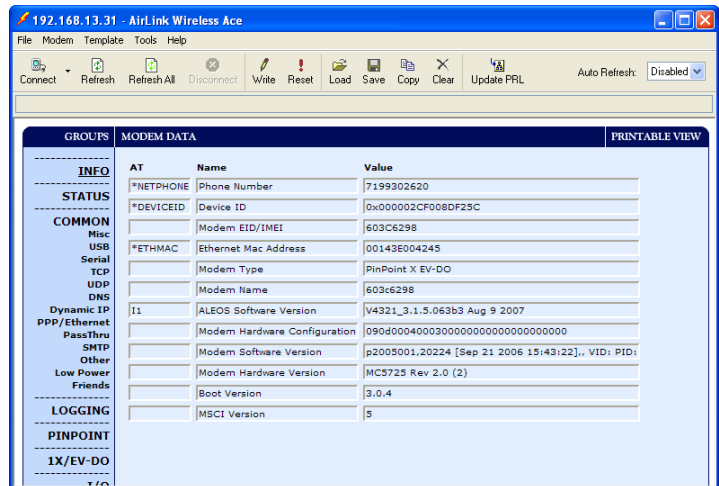


Figure 1-3: AceManager

Simplified Deployment

AceManger provides the ability to remotely set up and configure your Sierra Wireless AirLink products. Remote device setup and configuration reduces the deployment timeline of your wireless solution and provides a quicker path to ROI.

Templates allow you to easily configure other devices in your fleet with identical settings, ensuring a simple, accurate deployment.

Monitor and Control

AceManager allows an administrator to remotely monitor a modem's status, health and configuration settings. The user interface displays signal strength, cell site information, byte counters and error conditions, enabling you to pinpoint any issues and troubleshoot immediately.

AceManager enables remote configuration and parameter settings to be changed or reset instantly over the air, change a device's port configuration, IP address settings, and much more. After configuring one modem, use the template feature to copy that device configuration to other modems.

Tip: Configuration steps and examples in this guide use AceManager.

AceNet

AceNet, the enterprise grade productivity enhancing tool, enables you to efficiently deploy and monitor Sierra Wireless AirLink products on a large scale.

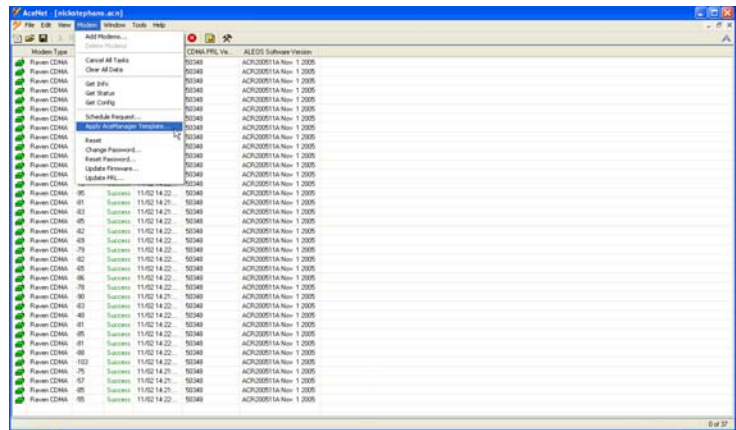


Figure 1-4: AceNet

Network Monitoring

AceNet allows you to efficiently deploy, monitor, and maintain wireless networks of any size by enabling you to quickly configure an entire group of Sierra Wireless AirLink modems to the same parameter settings using templates built with AceManger.

To ensure your implementation is optimal, users can easily see when modems are out of contact and periodically poll each device for performance statistics.

AceView

AceView is an efficient status and connection monitoring application with a low-profile, easy to read interface.



Figure 1-5: AceView

Modem Doctor

Modem Doctor is a troubleshooting and diagnostics utility. This utility will allow you to get a log file of the Raven activity which you can then send to Sierra Wireless support, erase the current configuration completely, and temporarily set the Raven to a known configuration to aid in trouble shooting (SOS mode).

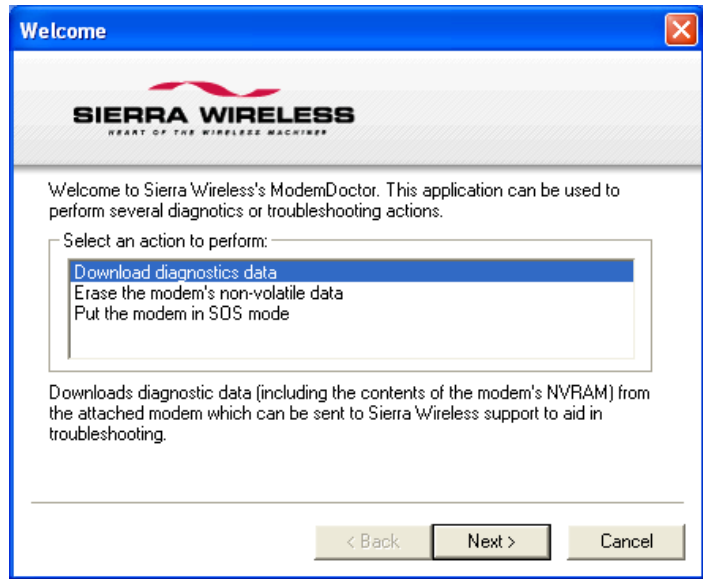


Figure 1-6: Modem Doctor

Modem Doctor USB

1. Open the ModemDoctorUSB.exe.
2. Select any one option.

Note: If you are using USB port as serial, then USB device is set to "0" and if you are using the default option then the USB device is set to "1".

The available port is automatically detected. Password is the fault password.

3. Press Erase. The modem will then reset.

Note: If you erase the factory defaults will be restored. USBnet is the factory default port.

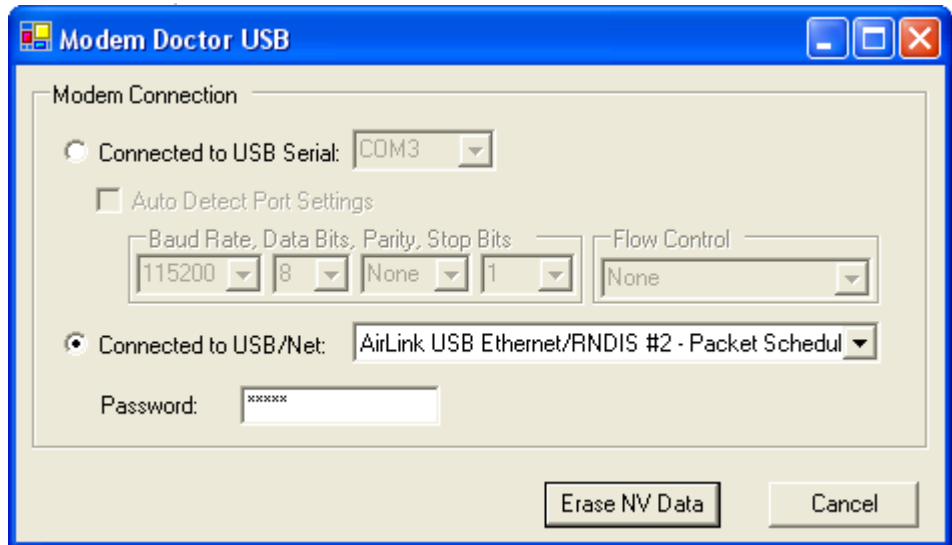


Figure 1-7: Modem Doctor: USB connection

Connecting to the TELUS Network

The Raven uses TELUS as an ISP (Internet Service Provider) to connect you to the Internet.

Steps of a connection:

1. When your Raven is powered on, it automatically searches for cellular service using iDEN.
2. Your Raven establishes a PPP (Point to Point Protocol or "dial" up connection) link to the TELUS network, also called registering on the network, and receives an IP address.
3. When your Raven has received its IP address from TELUS, a connection to the Internet or the cellular network is also available for a computer or other device connected directly to the Raven.

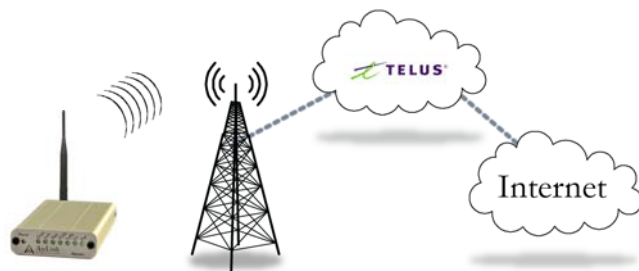


Figure 1-8: Connecting to the Internet

The Raven will perform a **one-to-one** routing for all internet traffic to and from the computer or other end device. One-to-one means that your Raven will provide a connection for one device to the Internet at a time. In Private Mode, the Raven will provide NAT (Network Address Translation) for the computer or other end device.

Note: The Raven does not provide advanced routing required by one-to-many (several devices connected to one port). If you need to have more than one device connected to the Internet through your Raven, you will need to have a router connected to the modem. The modem would provide the one-to-one connection to the router with the router configured to provide a broader NAT service to the other devices connected to it.

Dynamic vs. Static IP Addresses

There are two types of addresses on networks: dynamic and static.

- Dynamic addresses are assigned on a “need to have” basis. Your Raven might not always receive the same address each time it connects with TELUS.
- Static addresses are permanently assigned to a particular account and will always be used whenever your Raven connects to the Internet. The IP address will not be given to anyone else.

Most ISPs (cellular included) use dynamic IP addresses rather than static IP addresses since it allows them to reuse a smaller number of IP addresses for a large number of customers. A dynamic IP address is suitable for many common Internet uses, such as web browsing, looking up data on another computer system, or other client functions (such as data only being sent out or only being received after an initial request).

Tip: *If your account with TELUS includes a dynamic IP address and you need a static IP, please consult your TELUS Representative for more information about changing your account for static IP support.*

If you need to contact your Raven, a device connected to the Raven, or a host system using the Raven from the Internet, you need to have a known IP (such as one which is static) or domain name (an IP address which is converted by a DNS server into a word based name). If you have a dynamic IP

address for your modem, you can use a Dynamic DNS service (such as IP Manager) to translate your IP address into to a domain name.

Caution: *If you want to connect remotely to your Raven using TCP/IP, the IP address given to your modem by TELUS cannot be a private or internal IP address (such as special private network) unless you are on the same network or inside that network's firewall (such as with frame relay).*

iDEN Communication

Integrated Digital Enhanced Network (iDEN) is a mobile communications technology providing its users the benefits of a trunked radio and a cellular network. Using a SIM card with all the account data pre-programmed, installation of an iDEN modem is greatly simplified.

>> 2: Specifications

- Interface Port Pin-Outs
- Power Connector

Features and Benefits

- Embedded Intelligence
- Low Power Consumption
- Serial Port
- Machine Protocols
- Simple Integration with Legacy Equipment
- Persistent Network Connectivity
- Remote Management and Configuration
- Class I Div 2 Certified

Technology

- iDEN

Bands

- 800 Mhz Cellular

Environmental

- Operating Temperature:
 - -30 to 65° Celsius
- Storage Temperature:
 - -40 to 85° Celsius

Power Consumption: (@12V DC)

- Transmit/Receive (Typical/Max) 200/200 mA
- Input Voltage 9 - 28V DC

Standards/Approvals

- Carrier specific approvals
- FCC
- Industry Canada
- This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, D or unclassified or non-hazardous locations.

Host Interfaces

- RS-232: DB9 DCE (300-230400 baud)
- Antenna Connection:
 - Cellular - 50 Ohm TNC

Dimensions

- 76mm x 25mm x 129mm
- 317 grams

Application Interfaces

- TCP/IP, UDP/IP, DHCP, HTTP, SNMP, SMTP, SMS, MSCI, Binary, Modbus, and more

LED Indicators

- Channel
- Link
- Registration
- RSSI
- Transmission/Receive
- Power

Interface Port Pin-Outs

Serial Port

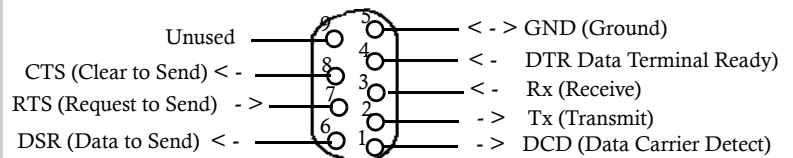


Figure 2-1: Serial Port Diagram: Female DB-9 DCE (not to scale)

Power Connector

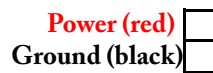


Figure 2-2: Power Connector (not to scale)

>> 3: Activating Raven on TELUS Network

- Installing the SIM
- Master Reset

This chapter provides step-by-step directions for activating your Raven on the TELUS cellular network.

Installing the SIM

The SIM in the Raven is a smartcard securely storing the key identifying a cellular subscriber. Generally, you will only need to install a SIM once in the life of the modem and it may be pre-installed by your Sierra Wireless Representative.

1. Before you start

If the SIM was pre-installed activation of your modem is complete.

Cellular Account Required

- **Cellular account** - To use your modem you need to have a SIM (Subscriber Identity Module) with an active account with an iDEN cellular provider.

Software Required

- **Terminal application** - for example Microsoft HyperTerminal.

Hardware Required

- **Serial cable** - A straight through serial cable.
- **Power adapter and a power source** - You will need a power supply and power source for the modem.
- **PC or Laptop** - To configure the modem, you will need a computer with an available serial port.

Tools Required

- **Small Phillips screw driver** - The Phillips screw driver is the one which is also called a plus (+) or X screw driver.
- **Slim stylus** - A PDA stylus, an unbent paperclip, or other such item.

1. Opening the Case

- a. Unplug the Raven power and all cables.
- b. Using a small phillips head screw driver, remove the screws on the back of the Raven.
- c. Slide the case off of the Raven and set it aside.



Figure 3-1: Partially removed case

2.

- a. Carefully remove the SIM card from the card you got from TELUS.

3. Ejecting the SIM tray

Tip: The button is between two boards.

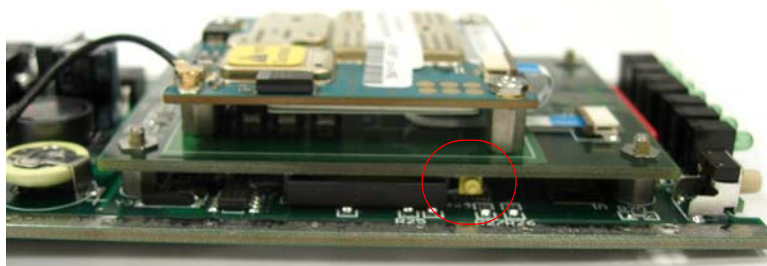


Figure 3-2: SIM tray button

4. Insert the SIM into the Tray

- a. Remove the SIM from the card you obtained from your TELUS.

Note: The card and SIM may be a different color than these examples.

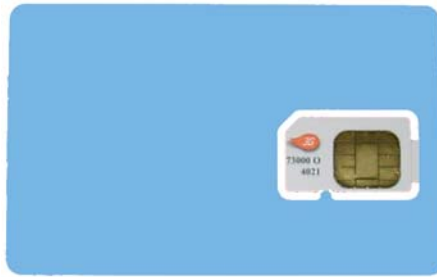


Figure 3-3: Sample of a Card with SIM



Figure 3-4: Insert SIM in to the modem

- b.** Place the SIM into the tray and gently press to click it into place.



Figure 3-5: Empty SIM Tray and a Tray with a Sample SIM

5. Insert the Tray and SIM

- a.** Slide the tray back into the modem.
- b.** Gently press to click it into place.

Tip: The top of the card faces the bottom of the modem.

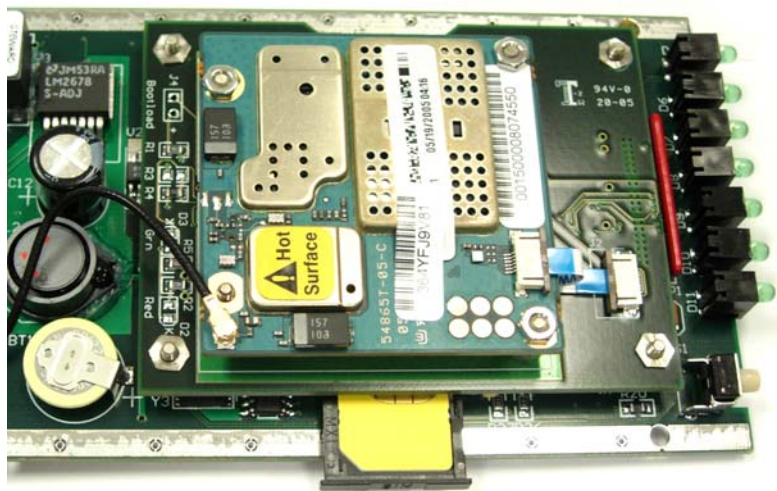


Figure 3-6: Inserting the SIM

6. Finishing the SIM installation

- a. Slide the Raven back into the case.
- b. Secure the back of the Raven with the screws.

Master Reset

Once you have the SIM installed, the final step for it to work with your Raven is issuing a master reset. You will need to connect to the Raven using a terminal application such as HyperTerminal with the Raven connected directly to your computer.

You can access and configure your Raven using a terminal application such as Microsoft HyperTerminal, PuTTY, or similar. The following directions are for HyperTerminal which is part of a standard installation of Windows XP.

Start > All Programs > Accessories > Communications > HyperTerminal

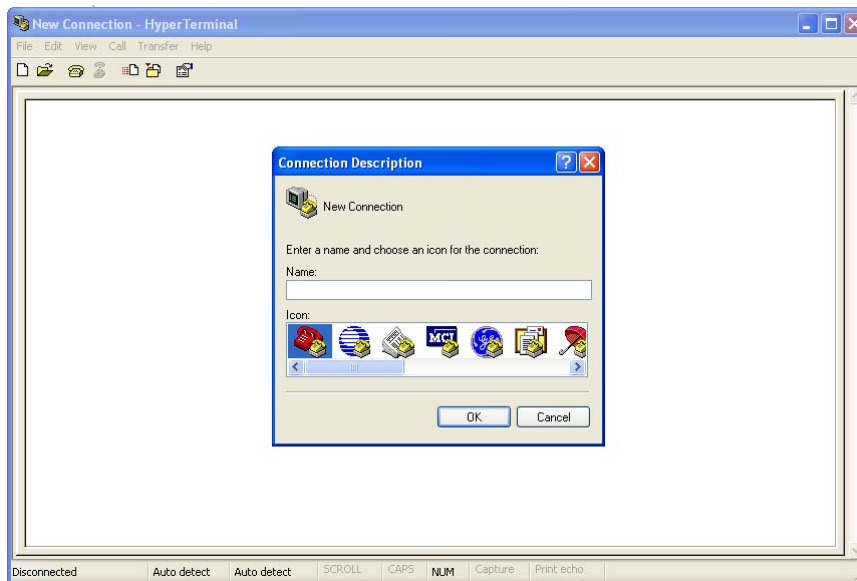


Figure 3-7: HyperTerminal

1. Choose a name and icon for your connection.

- a. Choose a name for your connection, such as *Raven* or *Sierra Wireless AirLink Solutions*. The name and icon are only for your own reference so you can find the connection at a later date.

Tip: If you want to have a connection saved for both local and remote, it is recommended the connection name reflect the connection type, i.e. *Raven local*.

- b. Select OK.

2. Connect To

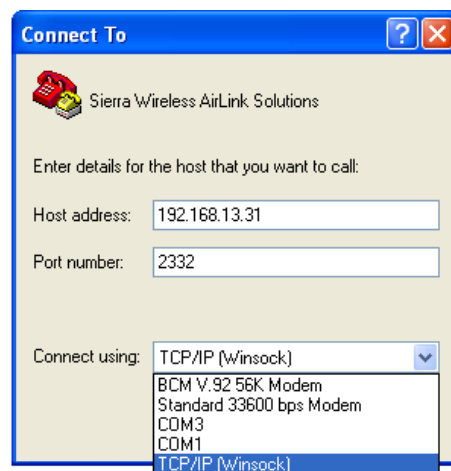
Using Serial:

- a. Select *COM1*, or the comport to which the modem is connected, for the "Connect Using".



Figure 3-8: Connect To

- b.** Type in 192.169.13.31 for Host Address.
- c.** Change the "Port Number" to 2332.



- d.** Select OK.

3. Port Settings (serial only)

- a.** Change or verify the settings:
 - Bits per Second: 115200 (default)
 - Data Bits: 8
 - Parity: None
 - Stop Bits: 1
 - Flow Control: Hardware.

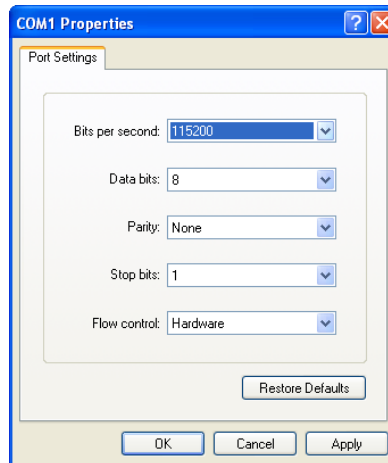


Figure 3-9: Port Settings

Tip: If you have configured the Raven for settings different than the defaults for Bits per Second, Data Bits, Parity, and/or Stop Bits, you will need to use your changed settings.

- b.** Select OK.

4. Connected

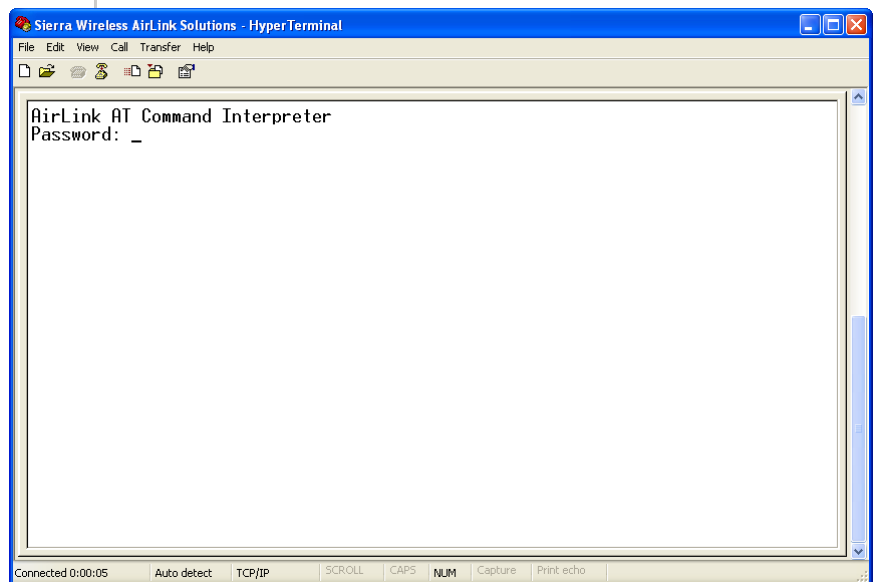


Figure 3-10: HyperTerminal : TCP/IP connected

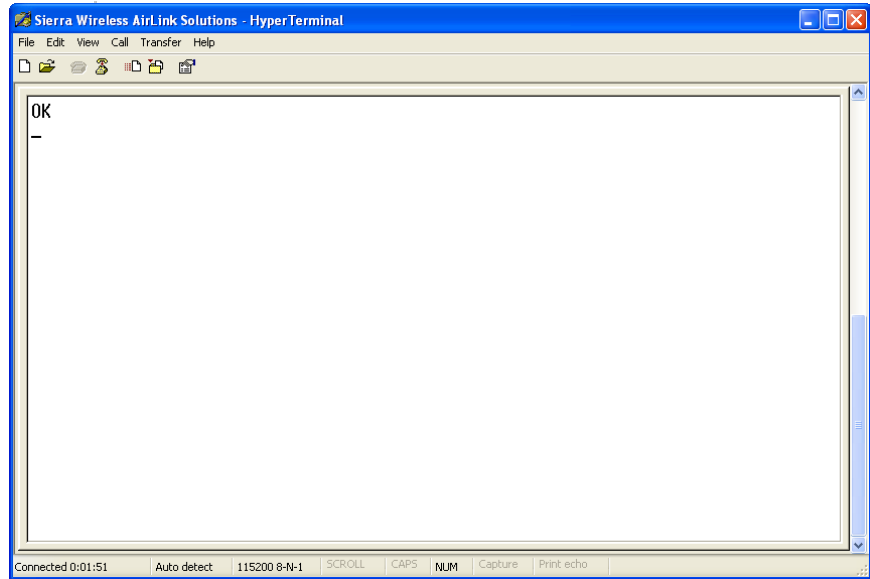


Figure 3-11: HyperTerminal : connected

Tip: You will not be prompted for a password if you connect using a COM port.

- a. Type *AT* and press *Enter*. You should get a reply of "OK" or "0".
- b. To see what you are typing as you type it, you will need to turn on the echo and verbose mode. Type *ATE1V1* and press *Enter*.
- c. If you get a reply of "OK", then you entered the command successfully. If you get a reply of "0" or "ERROR", try entering the command again.

5. Enter the Master Reset Command for iDEN

- a. Type **AT*PROVISION=000000, 0123456789**
- b. The Raven should respond with: "Master Reset Succeeded". With any other response, contact TELUS to check the account status.
- c. Press the reset button on the Raven.

The Raven should now register on the network.

4: Hardware Installation of the Raven

- Connecting to Power
- Connecting to a Computer or other Device
- Indicator Lights
- Mounting

Your Raven should be mounted in a position that allows easy access for the cables so they are not bent, constricted, in close proximity to high amperage, or exposed to extreme temperatures. The LEDs on the front panel should be visible for ease of operational verification. You should ensure that there is adequate airflow around the modem but that it is kept free from direct exposure to the elements, such as sun, rain, dust, etc.

In a mobile location, such as a car or truck, ensure the location is secure both against abrupt movements of the vehicle and from other items coming into contact with the modem.

Caution: *The Raven is in a hardened case and designed for use in industrial and extreme environments. However, unless you are using cables expressly designed for such environments, they can fail if exposed to the same conditions the Raven can withstand.*



Figure 4-1: Raven Connectors

Antennas selected should not exceed a maximum gain of 5 dBi under standard installation configuration. In more complex installations (such as those requiring long lengths of cable and/or multiple connections), it's imperative that the installer follow maximum dBi gain guidelines in accordance with the radio communications regulations of the Federal Communications Commission (FCC), Industry Canada, or your country's regulatory body (if used outside the US).

- RSS-102 (...Health Canada's Safety Code 6 for Exposure of Humans to RF Fields)
- RSS-129 (800 MHz Dual-Mode CDMA Cellular Telephones) (Analogue & CDMA)
- RSS-133 r1 (2 GHz Personal Communications)
- <http://www.industrycanada.ca>.

Your Raven will work with most Dual-Band PCS cellular antennas with a TNC connector that works in the high and low frequencies of the cellular technology of your modem. Connect the primary antenna or primary RF cable directly to the antenna connector on the back of the Raven.

Tip: When using a cable to an antenna placed away from the modem, minimize the length of your cable. All gain from a more advantageous antenna placement can be lost with a long cable to the modem.

Connecting to Power

Your Raven can be used with either DC, available in most automobiles, or 110 AC, standard US wall power, with the appropriate power adapter. DC cables and AC adapters are available as optional accessories in addition to the one included with your Raven.

The DC power cable positive lead should be connected to the battery or power source positive terminal. The power cable negative lead should be connected to the battery or power source negative terminal.

Note: When using a DC power source (such as a car battery or solar cell), Sierra Wireless recommends placing a fuse (1-2 Amp) on the line close to the power source to protect your power source from possible surges due to shorts or other line issues.

Connecting to a Computer or other Device



Figure 4-2: Serial

The serial port of your Raven can be connected directly to most computers or other devices using a standard straight through cable. If you have a DCE device, you will need a null modem or null modem cable.

Indicator Lights

When your Raven is connected to power and an antenna, there is a specific pattern to the lights to indicate its operation mode.



Figure 4-3: Raven Indicator lights

- **Chan (channel)** - Indicates the modem has acquired a network channel.
- **Link** - Indicates a successful connection to the cellular network.
- **Reg (registration)** - Indicates the Raven has acquired an IP from TELUS.
- **RSSI (signal level)** - Light shows the strength of the signal and may be nearly solid (strong signal) or flashing (weaker signal). A slow flash indicates a very weak signal.

RSSI LED Ranges

RSSI/Signal LED Status	Ranges of RSSI (dBm)
On Solid	Equal to or stronger than -69
Fast Blink	-70 to -79
Normal blink	-80 to -89
Slow Blink	-90 to -99
Extinguished	Equal to or weaker than -100

- **TxRx (transmit/receive)** - The light will flash as data is transferred to and from the Raven-E modem on the remote network.
- **Pwr (power)** - Indicates the power adapter is connected and there is power getting to the Raven.
- The **Reset button** performs the same function as unplugging power from the modem and plugging it back in. Reset will not alter any saved configuration settings.

Light Patterns

The LEDs on the front of the modem will respond in different patterns to indicate modem states.

- **Normal** - Each LED, mentioned above, lit as applicable.
- **Start up** - The LEDs will cycle from left to right.
- **PassThru mode** - The Chan, Reg, and Link LEDs will blink in tandem. The Tx and Rx LEDs will blink when transmitting or receiving data.

Mounting

An optional accessory for your Raven is a mounting kit, which includes a bracket. The bracket is designed to snugly cradle the modem and hold it in place where you need it. You can use a strap around the bracket and modem for extra security. The bracket can be attached to a stationary location using #6 screws with the mounting hole diameter approximately 0.150".



Figure 4-4: Optional Mounting Bracket

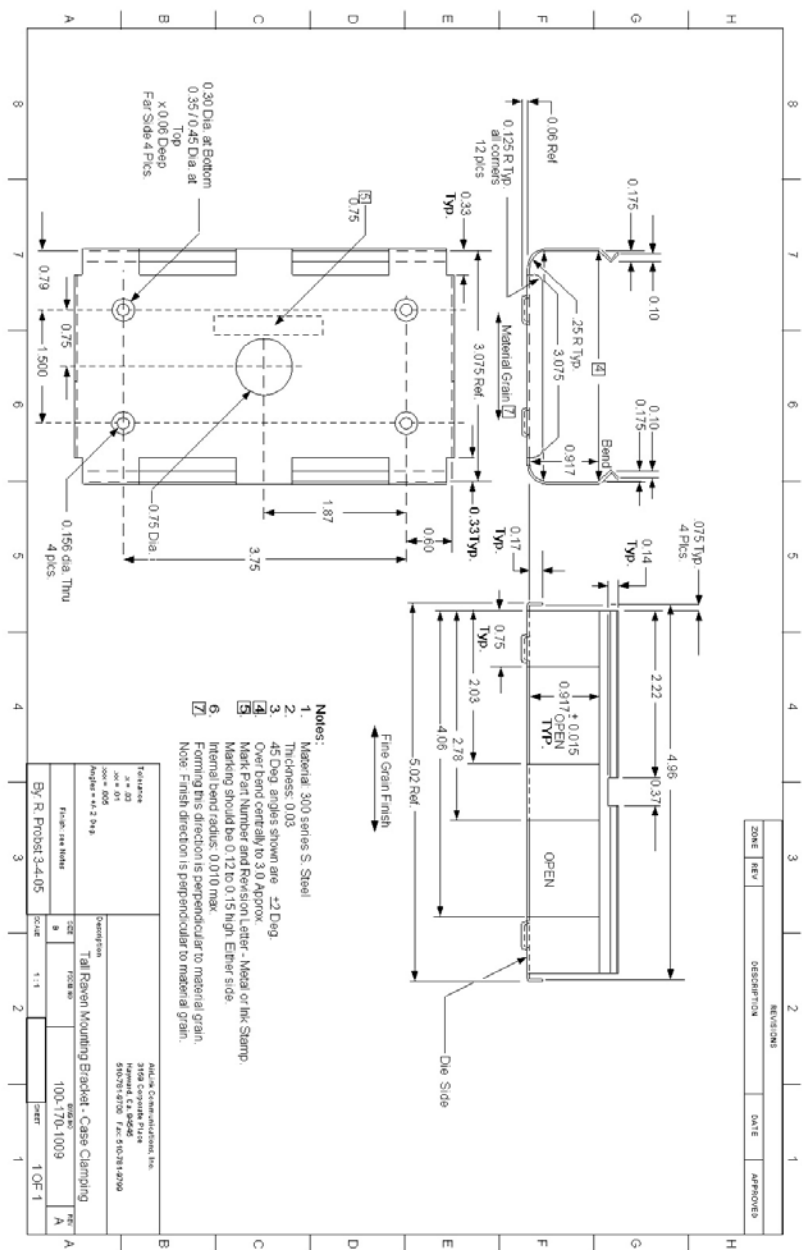


Figure 4-5: 100-170-1009 : Mounting Bracket for Raven

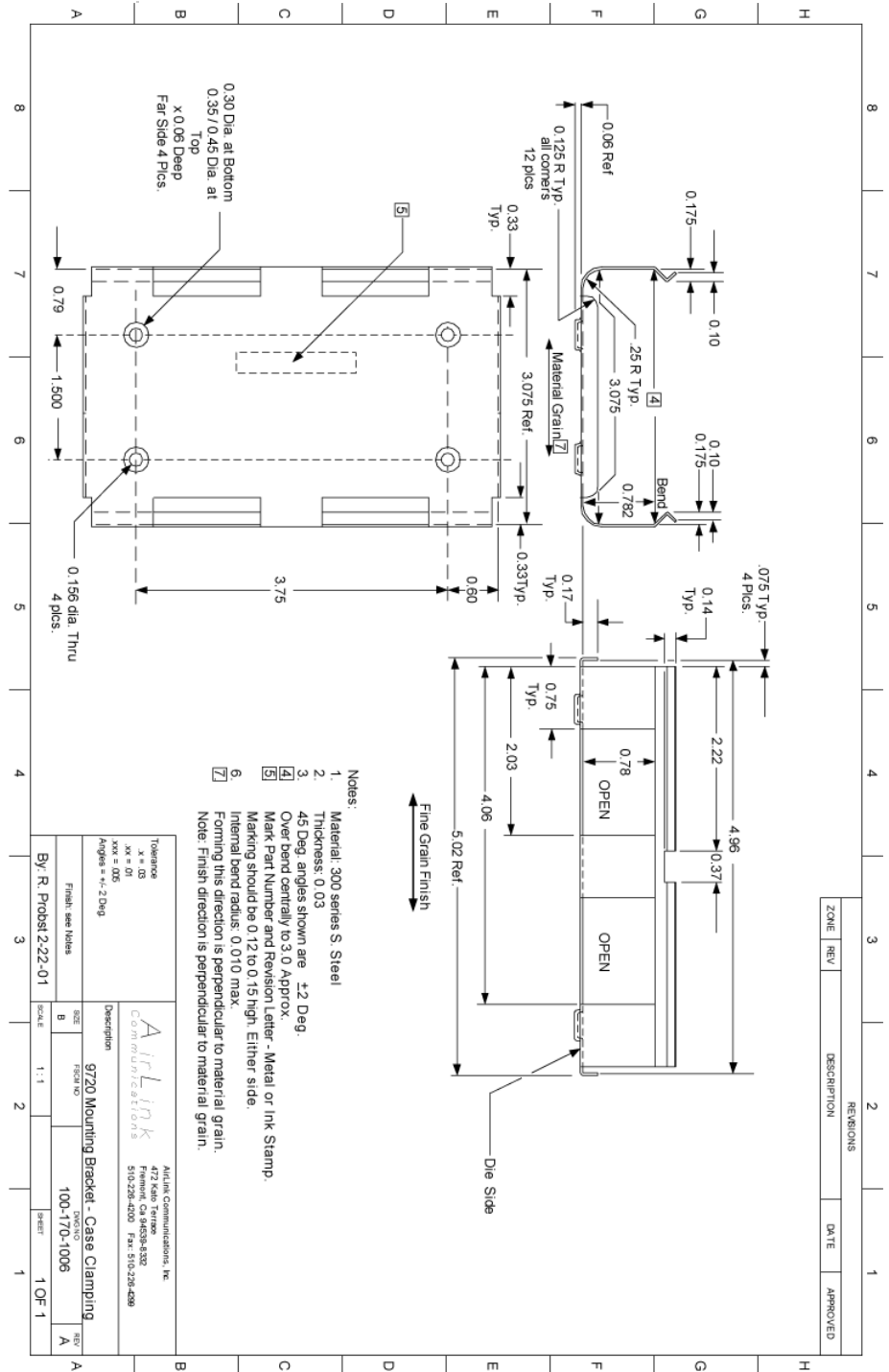


Figure 4-6: 100-170-1006 : Mounting Bracket for Raven

>> 5: Configuring your Raven

- Using AceManager
- Using Templates
- Using a Terminal Application with AT Commands

With ALEOS as its “brain”, the Raven is a highly configurable device, more than just a “dumb” modem.

To configure your Raven, you have two options. You can use the configuration and management applications of the AceWare suite or you can use a terminal emulator application such as HyperTerminal, PuTTY, or many others.

Since the AceWare applications are designed for ease of use, nearly all descriptions and screen shots of Raven configuration in this guide and Application Notes are done with AceManager. In addition to the various chapters in this guide giving information and directions about using the features of your Raven, the Configuration Commands appendix briefly describes all the commands available. To get a more expanded view of the other AceManager features, refer to the AceManager Guide.

A full listing of all the configuration commands for you modem are in [Appendix A](#).

Using AceManager

AceManager is a free utility and is available on the product CD or can be downloaded from the Sierra Wireless America website: <http://www.sierrawireless.com/support/AirLink/default.aspx>.

Tip: *AceManager is the same application as Wireless Ace. The name was changed to fit better with its features.*

1. Start AceManager

Start > All Programs > AirLink Communications > AceManager

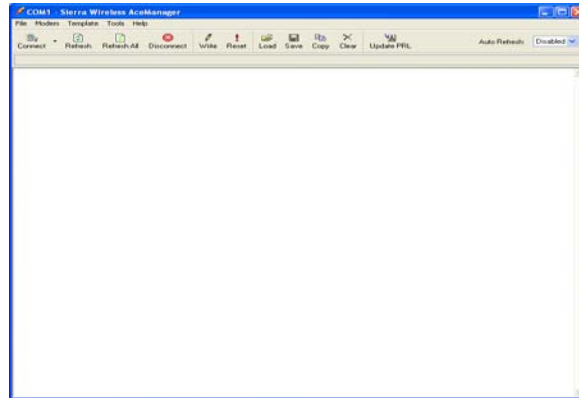


Figure 5-1: AceManager

2. Connect to your Raven

- a. Click the Connect button.

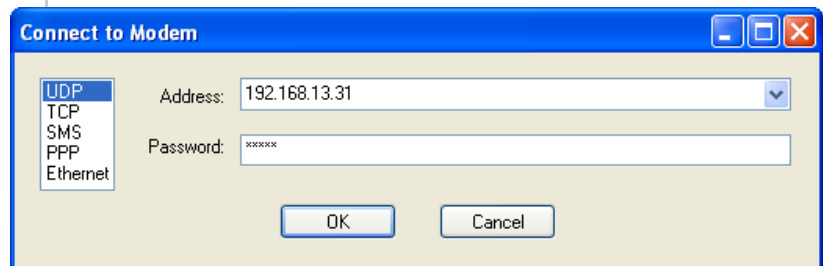


Figure 5-2: AceManager : Connect to Modem

- b. Select a connection method:
 - If you are connecting remotely, you can use UDP, TCP, or SMS.
 - If you are connecting locally with the modem connected directly to your computer using a serial cable, you can use PPP.
 - If you are connecting locally with the modem connected directly to your computer using an Ethernet cable, you can use UDP, TCP, or Ethernet.
- c. Enter the connection information.
 - For UDP or TCP, if you are connecting locally, use the *HOSTPEERIP of the modem to connect. The default for the *HOSTPEERIP is 192.168.13.31.
 - For SMS, enter the phone number of the modem and select your wireless carrier.
 - For PPP, select the COM port to which the modem is connected.
- d. Enter the password. The default password will be entered for you.

e. Select OK.

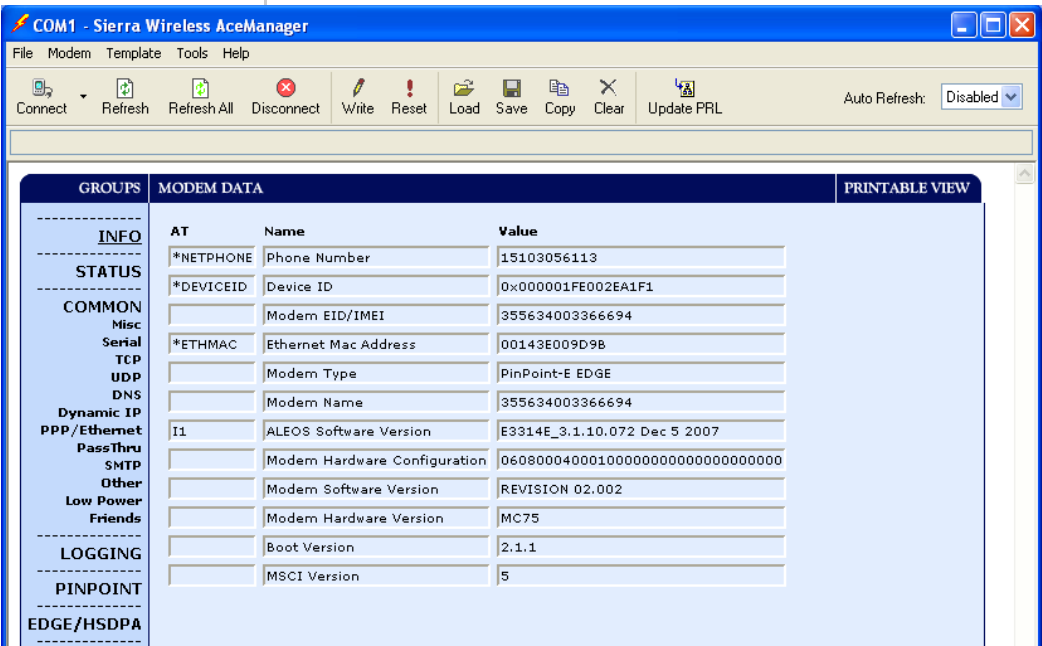


Figure 5-3: AceManager : Connected

3. Enter the configuration options

- a. On the left side of AceManager is the *Groups* menu. Select the appropriate group as needed or directed.
- b. Enter your changes in the *New Value* column by typing in the desired change or using the drop down menus.
- c. The current configuration is shown in the *Value* column.

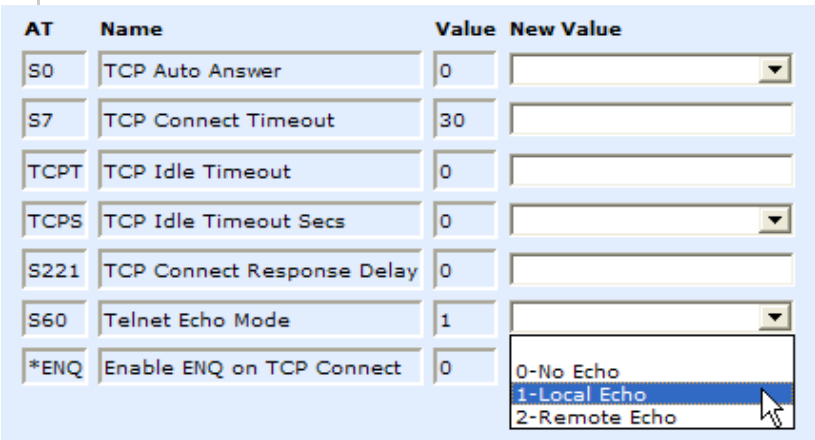


Figure 5-4: AceManager : Changing values

4. Write the changes to the modem

- a. Click the Write button on the tool bar of AceManager.
- b. Wait for the message “Write Successful” to appear in the status bar.

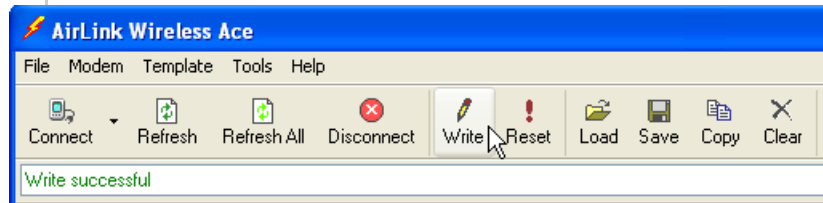


Figure 5-5: AceManager : Write

Tip: Some configuration settings will require you to reset the modem before they will take effect. You can reset the modem by using the Reset button in AceManager or by using the reset button on the modem. You can also reset the modem by cycling the power.

Using Templates

If you have a modem configuration that works well for your needs, using AceManager, you can save that modem's configuration as a template and then apply it to other Sierra Wireless AirLink modems.

1. Creating the Template with AceManager

- a. Configure the “master” modem.
- b. Click the Copy button on the tool bar to transfer all the configured settings to the New Value column.

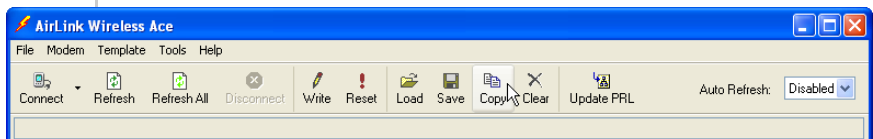


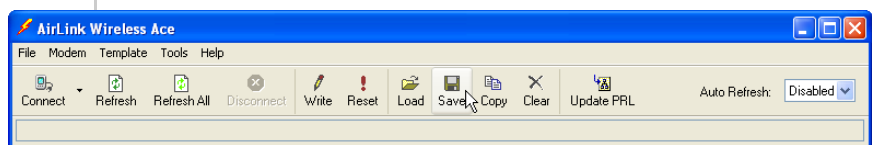
Figure 5-6: AceManager : Copy

- c. Remove settings which are specific to your “master” modem or verify settings are applicable to all your modems.

Note: Some of the configuration settings are specific to individual modems. You do not want to have those settings in your saved template otherwise the modems you configure with the template could cease to work with the cellular or local network.

- Cellular Technology specific settings ()
- *MODEMNAME
- *HOSTPRIVIP
- *HOSTPEERIP
- *HOSTUID
- *HOSTPW

d. Click the *Save* button on the toolbar.



e. Type in a file name that is descriptive of the template (so you can find it easily later) and save it to a location on your computer.

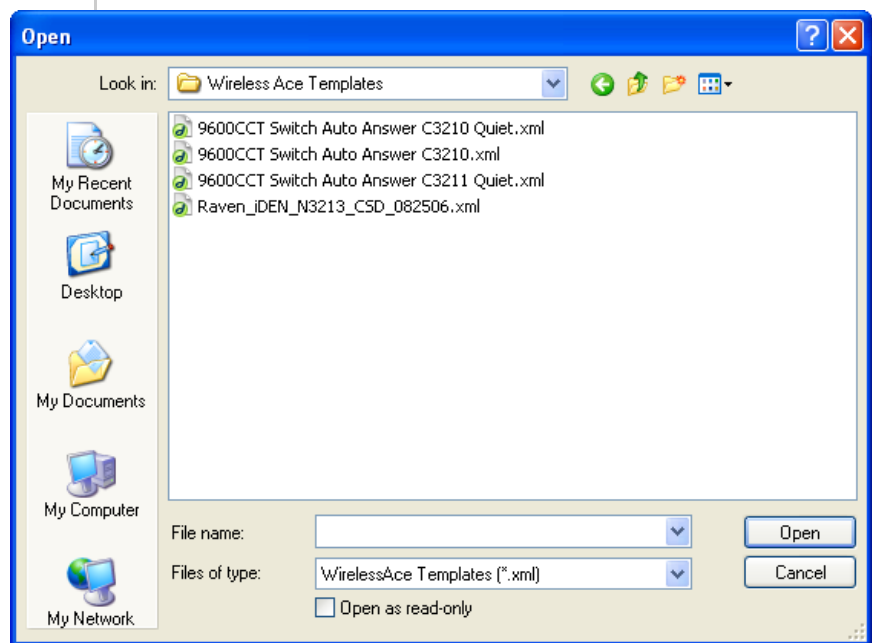


Figure 5-7: AceManager : Save Template

2. Applying a Template to one modem with AceManager

You can use a template you created yourself, using the steps above, or a template provided by your AirLink representative or someone in your company who has set up a modem template. The template you wish to apply must be saved to your hard drive.

- a. Load the template.
 1. Connect to the modem you want to configure using AceManager.
 2. Click on the *Load* button on the toolbar.

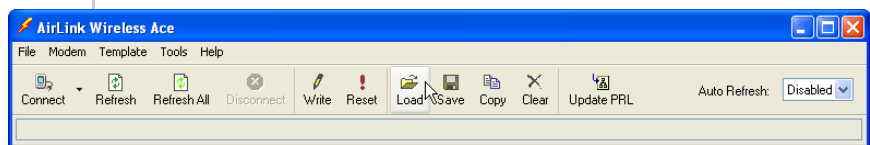


Figure 5-8: AceManager : Load

3. Select the template you have saved (you may need to change folders if you saved it to a different location).
- b. Verify the configuration settings.

Tip: After you load the template, it's best to go back over the AceManager groups to make sure all the settings are what you require.

- c. Click the *Write* button on the toolbar to write the configuration to the modem. Wait for the "Write Successful" message.

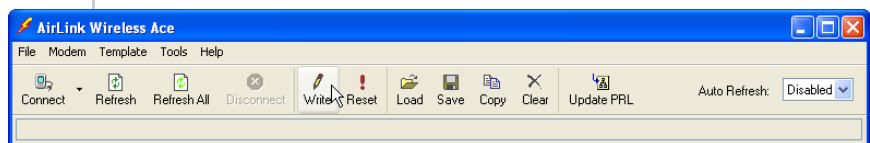


Figure 5-9: AceManager : Write

- d. Reset the modem.

Caution: Many of the configuration settings will not take effect until the modem has been reset.

Tip: You can use common settings on one modem to configure those same settings on another modem even of a different type. For example, you can use the serial settings of a modem (such as PinPoint X or Raven X) to configure the serial settings of a Raven. Settings not applicable to the modem on which you are loading the template, will be discarded.

3. Optional: Applying one template to several modems simultaneously with AceNet

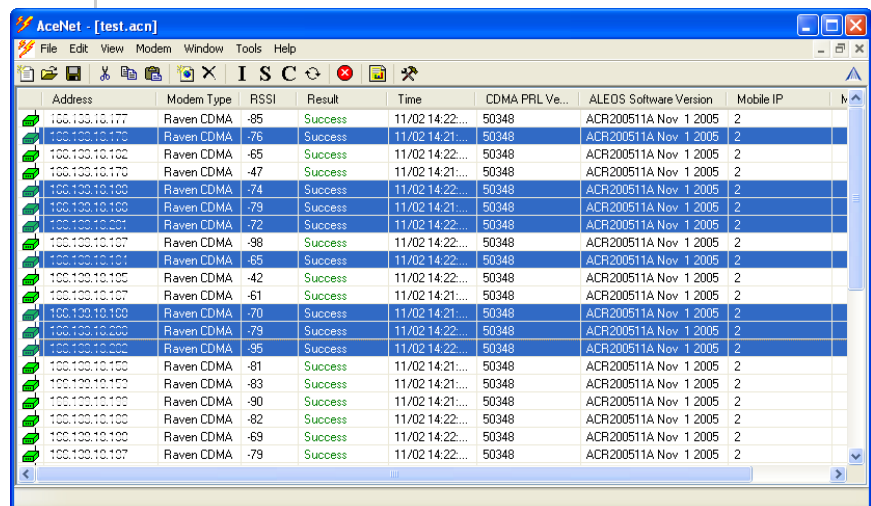
AceNet allows you to connect to and monitor several modems at the same time. For your convenience, you can also apply a single template to selected modems simultaneously.

Connecting to the modems with AceNet is covered in the AceNet User Guide.

Caution: When applying a template in AceNet, it is even more important to make sure there are no non-general settings in the template from the "master" modem.

Unlike AceManger, AceNet does not check the modem type before applying the template. Settings not applicable, such as a USB setting from a Raven XT template being applied to a Raven X, are not read by the receiving modem. You will get a "partial success" status if all items in a template cannot be applied by the receiving modem.

- a. Select modems to configure with the template.



The screenshot shows the AceNet application window with a menu bar (File, Edit, View, Modem, Window, Tools, Help) and a toolbar. The main window displays a table of connected modems. Each row represents a modem with columns for Address, Modem Type, RSSI, Result, Time, CDMA PRL Ve..., ALEOS Software Version, and Mobile IP. All modems listed are 'Raven CDMA' and show a 'Success' result.

Address	Modem Type	RSSI	Result	Time	CDMA PRL Ve...	ALEOS Software Version	Mobile IP
100.100.10.177	Raven CDMA	-85	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.170	Raven CDMA	-76	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.162	Raven CDMA	-65	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.170	Raven CDMA	-47	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-74	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.160	Raven CDMA	-79	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.161	Raven CDMA	-72	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.107	Raven CDMA	-98	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.101	Raven CDMA	-65	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-42	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.107	Raven CDMA	-61	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-70	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.200	Raven CDMA	-79	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.200	Raven CDMA	-95	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-81	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.102	Raven CDMA	-83	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-90	Success	11/02 14:21:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-82	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.100	Raven CDMA	-69	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2
100.100.10.107	Raven CDMA	-79	Success	11/02 14:22:...	50348	ACR200511A Nov 1 2005	2

Figure 5-10: AceNet : Selected modems

Tip: Click on the first with your mouse and, with the control button held down, click the additional modem.

- b.** Select the Modem option in the tool bar and then select Apply AceManager Template.

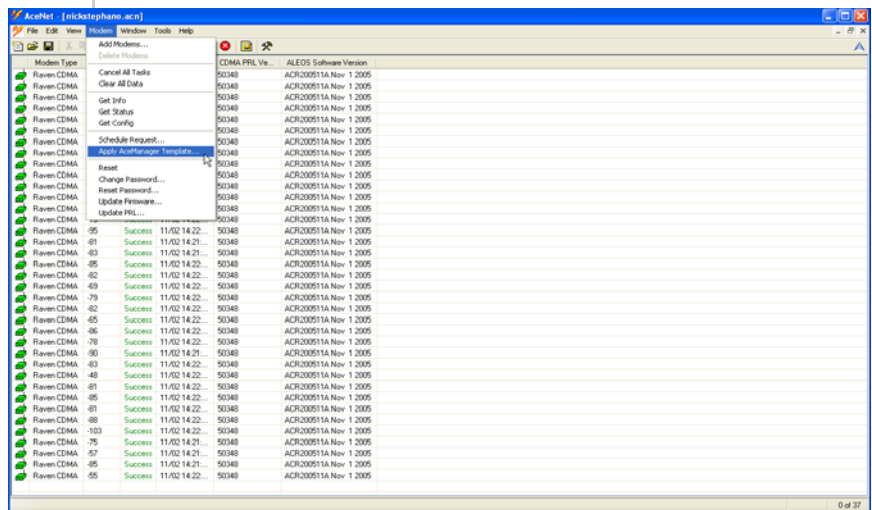


Figure 5-11: AceNet : Modem menu

- c.** Either type in the Template file name, or click browse and select the template file you want to apply (you may need to change folders).

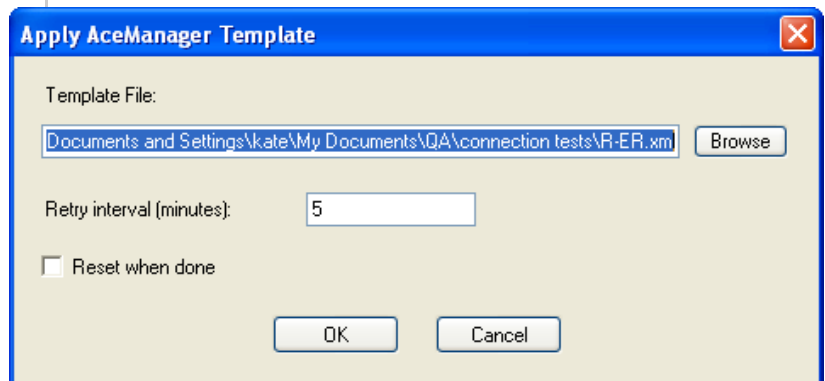


Figure 5-12: AceNet : Template select

- d.** Set the Retry Interval and check if you want to have the modems Reset when the template has been applied.

Using a Terminal Application with AT Commands

You can access and configure your Raven using a terminal application such as Microsoft HyperTerminal, PuTTY, or similar. The following directions are for HyperTerminal which is part of a standard installation of Windows XP.

Start > All Programs > Accessories > Communications > HyperTerminal

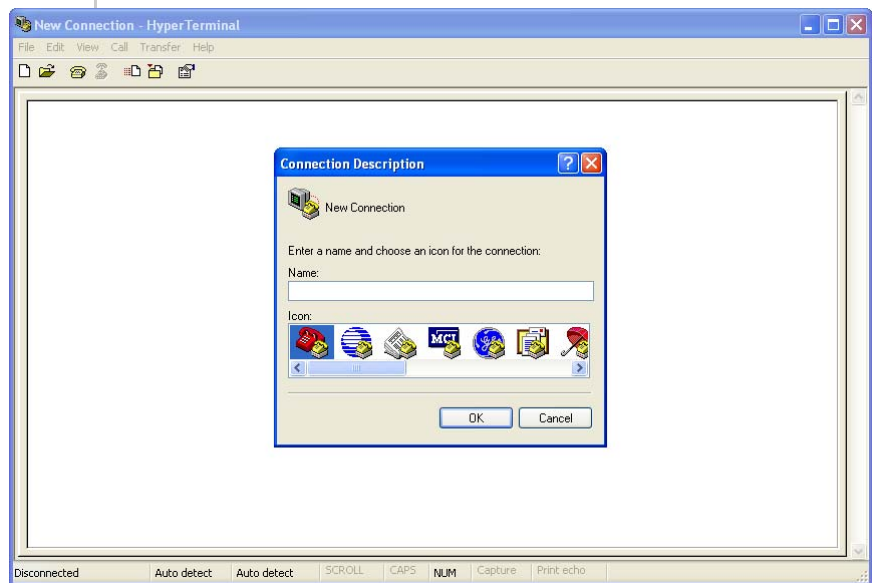


Figure 5-13: HyperTerminal

1. Choose a name and icon for your connection.

- a. Choose a name for your connection, such as *Raven* or *Sierra Wireless AirLink Solutions*. The name and icon are only for your own reference so you can find the connection at a later date.

Tip: If you want to have a connection saved for both local and remote, it is recommended the connection name reflect the connection type, i.e. *Raven local*.

- b. Select OK.

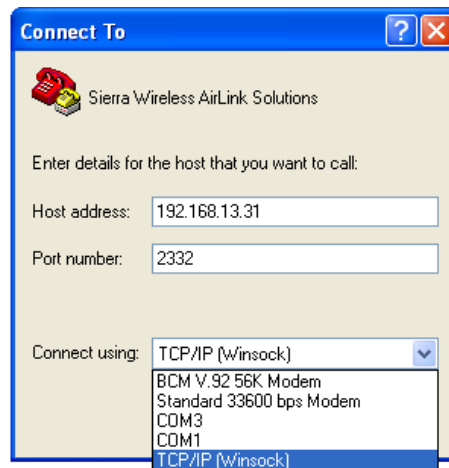
2. Connect To

- a. Select *COM1*, or the comport to which the modem is connected, for the “Connect Using”.



Figure 5-14: Connect To

- b. Type in *192.169.13.31* for Host Address.
- c. Change the “Port Number” to *2332*.



- d. Select OK.

3. Port Settings (serial only)

- a. Change or verify the settings:
 - Bits per Second: 115200 (default)
 - Data Bits: 8
 - Parity: None
 - Stop Bits: 1

- Flow Control: Hardware.

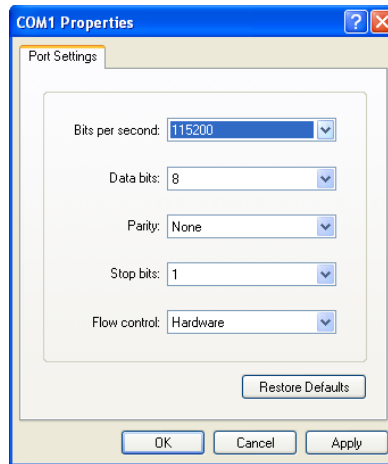


Figure 5-15: Port Settings

Tip: If you have configured the Raven for settings different than the defaults for Bits per Second, Data Bits, Parity, and/or Stop Bits, you will need to use your changed settings.

- Select OK.

4. Connected

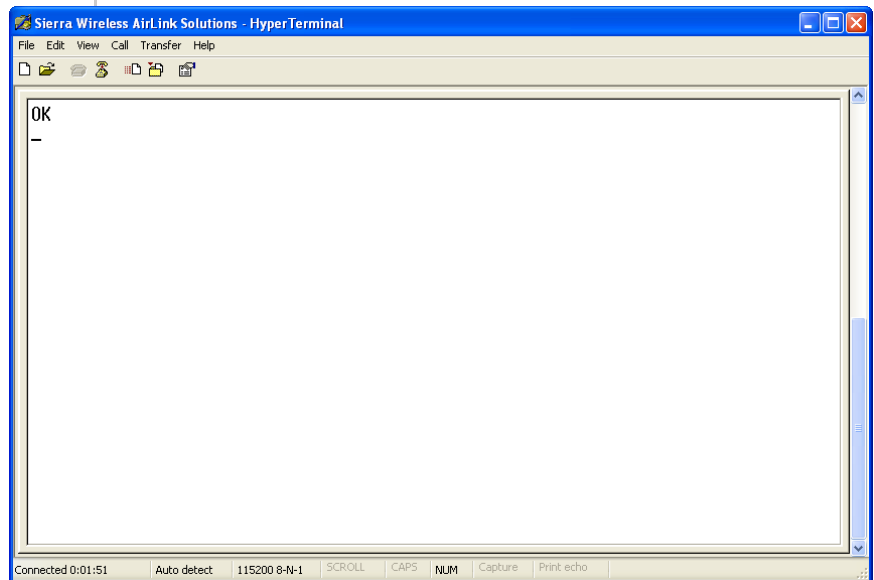


Figure 5-16: HyperTerminal : connected

- a. Type *AT* and press *Enter*. You should get a reply of "OK" or "0".
- b. To see what you are typing as you type it, you will need to turn on the echo and verbose mode. Type *ATE1V1* and press *Enter*.
- c. If you get a reply of "OK", then you entered the command successfully. If you get a reply of "0" or "ERROR", try entering the command again.

AT Commands

When using a terminal application, you will need to manually type in each command.

- For most commands, when you are entering them using a terminal connection, you will need to preface the command with AT (exceptions are noted), i.e. *ATA* which is listed as *A*.
- Some commands have specific parameters while other commands will take whatever you type.
- Required variable parameters are denoted with italicized text, example, *Dn*. The *n* is variable.
- Acceptable parameters and/or specific formats are listed with each command.
- Most commands with parameters can be entered with ? to read the current value (for example, *AT&D?* will respond with "2" if the default has not been changed).
- Optional parameters are denoted with square brackets [].
- AT Commands are not case sensitive. A capital "E" is the same as a lower-case "e".
- When you are using a terminal connection, if you enter a command which is recognized by the Raven, it will respond with "OK". If the command is not recognized, the response will be "ERROR".
- Those commands applicable only to certain model numbers of the Raven will be noted.

Caution: Symbols listed with commands, such as *, /, &, or ?, are part of the command and must be included. Commands with symbols other than * may require PassThru mode.

>> 6: Data Communication and Host Modes

- Basic Modes
- Serial Modes
- Data Communication

The Raven plays the part of a HOST when a computer or another device is connected directly to its port and routes data to/from the connected device to the cellular network.

Caution: *The Raven moves data from one port to the cellular network in a simple one-to-one routing. It does not employ a routing table or any complicated routing protocol.*

Tip: *If you need to have one-to-many routing, you can connect the Raven to a router. The router would provide the multiple routing and the Raven would provide one-to-one for the router to the cellular network and the Internet.*

As the host, the Raven can use different communication modes:

Basic Modes

- **AT:** The Raven accepts and responds to standard AT commands.
- **PassThru:** Direct connection to internal hardware (OEM Module) of the Raven.
- **Telnet:** The Raven auto-answers TCP connections to allow terminal emulation using remotely using the cellular connection.

Tip: *By default, the Raven is in AT Mode and allows AT Commands to be entered via terminal connection (through the local port connection) or remotely (through the cellular network). PassThru Mode can only be exited by resetting the Raven. All serial modes are entered by use of a startup mode command.*

Serial Modes

- **PPP Mode:** The Raven uses PPP to communicate with a device or computer connected to the serial.
- **SLIP Mode:** The Raven uses SLIP to communicate with a device or computer connected to the serial.

- **UDP and UDP PAD:** Any data received on the serial port is assembled into UDP packets and sent to the session's associated IP address and Port (described later). Any responses received from the associated IP address and port destined for the Device Port are unwrapped and sent out the serial port.
- **TCP and TCP PAD:** Any data received on the serial port is packaged into TCP messages and sent to the associated connection's IP address and Port (described later). Any data received from the TCP peer is unwrapped and sent out the serial.

Data Communication

- **Public and Private Modes:** The method used by the Raven to pass an IP address to a connected device.
- **Keepalive:** How the Raven maintains its connection to the cellular network.

Basic Modes

Start up Mode

The serial port of the Raven can be configured to enter any of the modes automatically on power up (in most cases, this is also after it has registered on the cellular network). This is done by setting the Startup Mode Default to the desired mode. If this setting is non-zero, the modem will enter the specified mode after 5 seconds. If you want to cancel this behavior, the ATMD0 command can be used before the 5-second time-out expires.

You can configure the Startup Mode in AceManager at part of the UDP group.

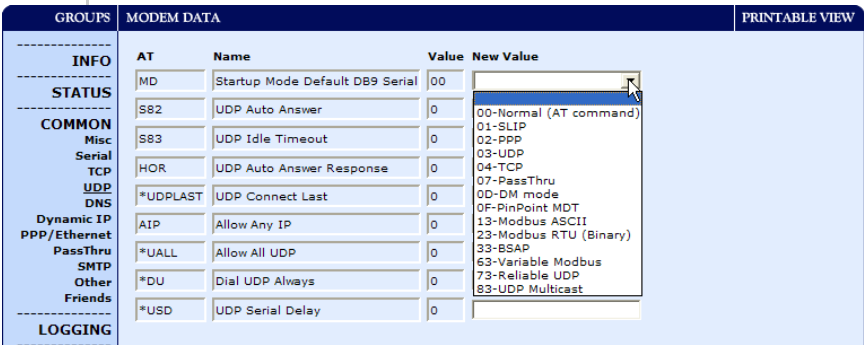


Figure 6-1: AceManager : UDP - MD

If the serial port of the Raven is in any mode other than AT or PassThru, the AT command mode can be re-entered by:

- Deactivating DTR (if &D2 or Ignore DTR, S211, is not set).
- Issuing the +++ escape sequence (if Disable AT Escape, DAE, is not set).
- Resetting or Power cycling the modem.

Note: DTR needs to be asserted (S211=1 or &D0) by the host before PPP Mode, SLIP Mode, UDP PAD Mode, or TCP PAD Mode can be entered.

AT Mode

Using a terminal connection, AT commands are used to configure the modem, command it to do something, or query a setting. For a full listing of the AT commands, refer to the appendix. AceManager is a graphical user interface for most AT Commands.

- AT commands must always be terminated by <CR> (ASCII character 0x0D), a carriage return (pressing enter on the keyboard). Some may also include a new line or line feed <LF>.
- If **E=1** (Echo On), the AT command (including the terminating <carriage return> will be displayed (output) before any responses.
- Two settings affect the format of AT command output: **V** (Verbose) and **Q** (Quiet).
- If **Q=1** (Quiet On), no result codes are output whatsoever, so there is no response generated by a (non query) command.
- If **Q=0** (Quiet Off), result codes are output. The format of this output is then affected by the Verbose setting.

If Quiet mode is off, the result code is affected as follows:

For **V=1** (Verbose mode), the textual result code is surrounded by a carriage return and new line. Any AT query response is also surrounded by a carriage return and new line.

For **V=0** (Terse mode), a numeric result code is output with a single trailing carriage return (no new line is output), while any AT query response is followed by a carriage return and new line (there is no preceding output).

- For example, possible output to the AT command "AT" with carriage return (assuming quiet mode is not on) is:

carriage return - if V=0
carriage return and new line OK another carriage
return and new line - if V=1

Note: These commands work for the port on which they are executed. For example, if the user types ATE1 and then AT&W using a serial port connection, it will set the serial port to Echo On.

PassThru Mode

In PassThru mode, the Raven does not behave normally, all port communication is passed directly between the internal hardware and the computer connected directly to the modem. This mode can be used to configure hardware-specific settings. For example, provisioning, troubleshooting, communicating with legacy equipment, etc.

Caution: ALEOS is disabled in PassThru Mode. You cannot use most ALEOS specific commands while the modem is in PassThru Mode. While in PassThru mode, you also cannot use AceManager to connect with the PinPoint.

Issuing the “AT\APASSTHRU” from a terminal emulation enters this mode. The modem responds with OK, at which point a direct connection to the internal hardware is established. You can also configure the modem to enter PassThru mode on start up using MD.

Tip: PassThru can only be exited by resetting or power-cycling the modem. This mode cannot be entered via a remote Telnet session.

You can configure a string of AT commands to be sent to the Raven when it enters PassThru and other PassThru settings.

GROUPS	MODEM DATA	PRINTABLE VIEW		
INFO	AT	Name	Value	New Value
STATUS	*PTINIT	Passthrough Init String		
COMMON	*PTREFRESH	Passthrough Init Refresh (Minutes)	0	
	*RESETPERIOD	Modem Reset Period (Hours)	0	
	*CSX1	Passthrough Echo	0	
Misc				
Serial				
TCP				
UDP				
DNS				
Dynamic IP				
PPP/Ethernet				
PassThru				
SMTTP				

Figure 6-2: AceManager : PassThru

PassThru Mode allows only specific AT commands. Some ALEOS commands will be unavailable when the Raven is in PassThru mode. The commands usable also depend heavily on the modem model number (found on the label on the top of the Raven).

Note: Some internal hardware requires upwards of 20 seconds before AT commands can be entered, so be patient if there seems to be no response to AT commands.

Telnet Mode

In AceManager you can configure Telnet operation.

GROUPS	MODEM DATA		PRINTABLE VIEW	
INFO STATUS COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other Friends	AT	Name	Value New Value	
	S0	TCP Auto Answer	0	
	S7	TCP Connect Timeout	30	
	TCPT	TCP Idle Timeout	0	
	TCPS	TCP Idle Timeout Secs	0	
	S221	TCP Connect Response Delay	0	
	S60	Telnet Echo Mode	1	
	*ENQ	Enable ENQ on TCP Connect	0	

Figure 6-3: AceManager : S0

If you need to change the port for Telnet (for example, you have the default port blocked on your firewall), the option is on the Other tab. The default telnet port is 2332. You can also change the Telnet timeout, if the connection is idle, default 2 minutes.

TCP	*TPORT	AT Telnet Port	2332	
UDP	*TELNETTIMEOUT	AT Telnet Port Timeout (Minutes)	2	
DNS	DAE	Disable AT Escape	0	
Dynamic IP	*DATZ	Disable ATZ Reset	0	
PPP/Ethernet				
PassThru				
SMTP				
Other				

Figure 6-4: AceManager : Other - *TPORT, *TELNETTIMEOUT.

Serial Modes

PPP

In PPP mode, the Raven acts as a PPP server, providing an IP address, and DNS servers (if available) to the connected device or computer.

PPP mode is entered from the AT mode by using any of the following commands:

- AT\APPP
- ATDT10.0.0.1
- ATDT10001
- ATD#19788 or #777 *99***1#
- CLIENT

In response to any of the preceding commands, the Raven will respond with CONNECT a carriage return and new line and is ready for the host to begin PPP negotiations. The IP received by the host in the resulting negotiation will either be a private (non-routable) IP address or a public (network-routable) IP address provided by the network, depending on the settings of ***HOSTPRIVMODE**. If ***HOSTPRIVMODE=1**, the value of the private IP address can be determined beforehand by querying **S110**. The private IP address to be used can be defined with the command **AT*HOSTPRIVIP=192.168.100.33**, substituting the desired IP address.

GROUPS	MODEM DATA			PRINTABLE VIEW
----- INFO -----	AT	Name	Value	New Value
STATUS	*HOSTPRIVMODE	Use Private IP	0	<input type="text"/>
-----	*HOSTPRIVIP	Host Private IP	0.0.0.0	<input type="text"/>
COMMON	*HOSTPEERIP	Modem Local IP	192.168.13.31	<input type="text"/>
Misc	*HOSTNETMASK	Host network mask	0.0.0.0	<input type="text"/>
Serial	*HOSTAUTH	Host Authentication Mode	0	<input type="text"/>
TCP	*HOSTUID	Host User ID	ZCFzUUeLycb2ug01L+3IkW==	<input type="text"/>
UDP	*HOSTPW	Host Password	ZCFzUUeLycb2ug01L+3IkW==	<input type="text"/>
DNS	*DHCPSEVER	DHCP Server Mode	1	<input type="text"/>
Dynamic IP				
PPP/Ethernet				
PassThru				
SMTP				
Other				
Friends				

LOGGING				

1X/EV-DO				

TELEMETRY				

ADDR LIST				

Figure 6-5: AceManager : PPP/Ethernet

Using a private IP insulates the PPP client from changes in IP addresses of the underlying network. The will perform basic NAT-like address translation on all packets.

If a public IP address is being used, any changes in the IP (as determined by the wireless network) will result in the PPP link to the host being disconnected, requiring the host to reinitiate it. The public IP is passed to the host in the PPP negotiations, so when the network forces a change, the modem has to force the host to renegotiate the PPP link to make this happen.

SLIP

SLIP mode is entered by using the “**AT+ASLIP**” command. As in PPP Mode, the IP address that the host assumes is affected by the setting of *HOSTPRIVMODE. SLIP does not negotiate the IP address with the connected device or computer, so before making a SLIP connection, the SLIP driver on that device or computer must be configured to use the IP address specified by querying **S110**.

UDP and UDP Pad

When the modem is in UDP PAD (Packet Assembly and Disassembly) Mode, all characters received on the serial port are assembled into UDP packets and sent to the remote IP address/port or the Raven, and any packets received from the same IP/port-destined for the device port of Raven (see *DPORT)--are disassembled and dumped onto the serial line.

A UDP session is initiated by one of the following events:

- Using the Dial UDP (DP) AT command (example, ATDP192.168.3.23/3456).
- Setting the Startup Mode Default (MD) to 3 (UDP) so that a UDP session is entered automatically when the modem registers onto the network. Serial data will be sent to the IP/port specified in S53.

Incoming UDP packets will be processed out the serial port if

- UDP auto answer is enabled (S82=2);
- The destination IP address matches that in S53 (if Friends Mode is enabled, the IP address also needs to be present on the Friends List);
- Or allow any IP is set (AIP=1);
- The modem is in AT mode (not in a current UDP or TCP session).

UDP packet assembly is affected by the values of S50 (PAD Forwarding Time-out) and S51 (PAD Forwarding Character). Data received in the serial buffer will be transmitted when the idle inter-character time-out specified in S50 (in tenths of seconds) occurs or when a character is received that matches S51 (if non-zero).

UDP Auto Answer

UDP auto answer (previously called UDP half-open) is set with S82=2. When set, the Raven will automatically establish a UDP session to the source IP address and port of the UDP packet received. The Raven will remain “locked” to this one

remote IP/port until no data is sent or received for the time interval defined in the UDP auto answer time-out (S83). During this session, packets from other IP/port addresses will be rejected, unless *UALL is set. Whether or not an incoming packet will cause the modem to enter a UDP session is always dependent on the S53 and AIP settings.

The Normal UDP Mode (MD3) can be combined with UDP auto answer to cause the incoming serial data to be sent in UDP packets (instead of being treated as AT commands), while allowing sessions to be established from different UDP sources. A UDP session will be initiated either by incoming serial data or by an incoming UDP packet. The session, started by either method, will be terminated when no data has been sent or received for the S82 period. Once the session terminates, another may be initiated by either means.

When idle, after the time-out has occurred, the modem is in AT command mode on the serial port, and any valid AT command may be entered during this time.

Tip: *It is best to ensure the idle time-outs for TCP and UDP are never 0 if you're going to be using auto-answer, or either PAD mode. In those circumstances, you will want the modem to close the socket if the connection goes idle for too long, particularly if the other side doesn't normally close the connection.*

When the session is initiated by serial data, the new session will be established using the destination address specified in S53. The S53 setting can be changed if the connect to last UDP setting (*UDPLAST=1) is set. The address in S53 will be updated to reflect the address of the last session initiated by an incoming UDP packet. So that when new data is received over the host serial port while in the idle state, a session will be re-established with the last address. (This behavior is the same as the previous Hybrid2 (MD6) mode).

Tip: *TCP auto answer (S0) may also be set simultaneously with UDP auto answer. Then, when in the idle state, the modem will accept either a TCP or UDP incoming packet, and enter a TCP or UDP session as appropriate.*

Reliable UDP

Reliable UDP adds a simple protocol on top of UDP to provide reliable delivery of data. When data is received from the host serial port, a 2 byte header is added to the data, containing a message type and a sequence number. The Raven will continue to send this data (buffering any received data in the meantime)

until it receives an acknowledgement with this sequence number. If an acknowledgement is not received within the time-out period (specified in S7), the data will be retransmitted. This will continue until an acknowledgement is received or the modem is reset. Likewise any UDP packets received by the Raven are expected to have this simple header. The Raven will issue an acknowledgement for any valid packets which are received.

To configure the Raven for a normal UDP session, you need to set the Startup Mode Default to 73 (ATMD73). If you are using two modems, configure the Destination IP and Port in each to point to each other. Serial data will then be sent reliably between the two.

Caution: *Although it adds reliability, the simple implementation of the Reliable UDP mode in the does not check for duplicate packets.*

UDP Multicast Mode

UDP Multicast mode results in any data received from the host serial port being sent to all the clients in the address list. The remote port number is taken from S53. To avoid flooding the network, the packets are sent to each client with a 20ms pause in between. The receipt of UDP packets works as in normal UDP mode (i.e. bound by the value S53 and/or AIP). Since it may take a while to transmit the data to all hosts (especially if all 20 Modbus entries are used and name resolutions are required), new data received from the host port is buffered until current transmissions to all hosts are finished.

Enter the list of target IPs in the address list (ADDR LIST). The index numbers in the list aren't used. Configure for a normal UDP session. Set the Startup Mode Default to 83 (ATMD83). Configure the Destination port to match the device port of the remote modems.

TCP and TCP Pad

When the Raven is in a TCP session, all characters received on the serial port are assembled into TCP packets and sent to the mode's remote IP address/port, and any packets received from the remote end of the TCP connection are disassembled and dumped onto the serial line.

A TCP connection is established by one of the following methods:

- Using the Dial TCP (DT) AT command. For example, **ATDT192.168.3.23/3456**.

- TCP auto answer is enabled (**S1**), a TCP connection request is received, and the modem is not in a data session.
- Data is received on the serial port and
 - The Startup Mode Default (**MD**) is 4 (auto TCP)
 - The remote TCP destination, as defined in S53, successfully responds to the TCP connection request.

The value of **S7** (TCP Connection Time-out) specifies the number of seconds to wait, after initiating a TCP connection attempt, for a successful connection to be established. If the connection has not been successfully established before the time-out occurs, ERROR/BUSY is returned.

TCP packet assembly is affected by the values of **S50** (PAD Forwarding Time-out) and **S51** (PAD Forwarding Character). Data received in the serial buffer will be transmitted when the idle inter-character time-out specified in S50 (in tenths of seconds) occurs or when a character is received that matches **S51** (if non-zero).

The TCP session will be terminated if no data is transmitted or received for the time interval specified in **TCPT** and **TCPS**. TCPT is the number of minutes (TCPS=0) or seconds (TCPS=1) used for this idle time-out.

Caution: *TCPT should never be 0 when using the TCP mode. A broken TCP session can result in the modem being left with a TCP half-open connection that can only be terminated with a reset.*

TCP Auto Answer

TCP auto answer (S0=1 | 2) also allows a TCP connection request to be “answered” when the modem is idle, not in a data session. The TCP connection request's destination port has to match the modem's device port.

Note: UDP auto answer may also be set simultaneously with TCP auto answer. Then, when in the idle state, the modem will accept either a TCP connection request or UDP incoming packet, and enter a TCP or UDP session as appropriate.

Hybrid Modes

Hybrid modes are supported mainly for legacy implementations. Some previous hybrid modes (MD=5, 6) are no longer implemented as special, unique modes. Now that UDP auto answer (UDP Half-open, S82=2) can be enabled in conjunction

with UDP PAD mode (MD3), effectively this is the same as MD5 and MD6 previously accomplished. Setting MD5 and MD6 are still supported, but not recommended.

AT Command	Hybrid Mod (MD5)	Hybrid Mode2 (MD6)
MD	3	3
S82	2	2
S0	1	1
*UDPLAST	0	1

Note: The Raven forwards messages to and from the cellular network for only ONE device per port. The Raven is a one-to-one gateway and does not have advanced routing features required to do one-to-many routing.

Data Communication

The primary purpose of the Raven is to forward data from a single device connected to one of the ports to the cellular network and, ultimately, under most circumstances, to the Internet in a **one-to-one** gateway configuration.

When the Raven obtains its IP address from TELUS, it also obtains the network routing information necessary to forward messages to their routers which can then forward on from there. The Raven then acts as a router for the device connected to it, forwarding to or from the cellular network.

Public and Private Mode

In Public Mode, the Raven will pass the IP address assigned by the cellular network to the device connected to its port. Public Mode is the default mode for the Raven.

If you need more control over which gateway address, device address, and netmask that is given out by the internal DHCP server, you can use the private host mode, *HOSTPRIVMODE, and set the internal network IP addresses. The Raven will use NAT to forward packets to the end device.

Tip: *When using Public mode, Sierra Wireless recommends connecting the modem directly to the computer or other end device. Using a hub or switch may prevent the Raven from updating the IP address of the end device when an IP address is received from the cellular network.*

In AceManager, the Private mode settings are part of the **PPP/Ethernet** group.

GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*HOSTPRIVMODE	Use Private IP	0	<input type="text"/>
COMMON	*HOSTPRIVIP	Host Private IP	0.0.0.0	<input type="text"/>
Misc	*HOSTPEERIP	Modem Local IP	192.168.13.31	<input type="text"/>
Serial	*HOSTNETMASK	Host network mask	0.0.0.0	<input type="text"/>
TCP	*HOSTAUTH	Host Authentication Mode	0	<input type="text"/>
UDP	*HOSTUID	Host User ID	ZCFzUUeLycb2ug01L+31kw==	<input type="text"/>
DNS	*HOSTPW	Host Password	ZCFzUUeLycb2ug01L+31kw==	<input type="text"/>
Dynamic IP	*DHCPSEVER	DHCP Server Mode	1	<input type="text"/>
PPP/Ethernet				
PassThru				
SMTP				
Other				
Friends				
LOGGING				
1X/EV-DO				
TELEMETRY				
ADDR LIST				

Figure 6-6: AceManager : PPP/Ethernet

- ***HOSTPRIVMODE** - Set to 1 to enable the explicit IP addresses.
- ***HOSTPRIVIP** - Set to the IP address you want the Raven to give to your device.
- ***HOSTPEERIP** - Set to the IP address you want for the Raven.
- ***HOSTNETMASK** - Set to the subnetmask, generally 255.255.255.0.

Tip: If you are using Private Mode (*HOSTPRIVMODE=1), you will need to make sure that *HOSTPRIVIP and *HOSTPEERIP are on the same subnet. If the subnet mask is 255.255.255.0, it is safe to use 192.168.x.y for each as long as the x is the same number (0 in the example screen shot above) and the y is different (1 and 2 in the example) and between 0 and 254.

Keepalive

Keepalive is used to test the connection to the cellular network by pinging an IP address after a specified period of inactivity. Keepalive is only recommended for users who have a remote terminated modem that infrequently communicates to the network or if you have experienced issues over time where the modem can no longer be reached remotely.

When Keepalive pings the IP address, an acknowledgement indicates there is an active connection to the network. If the Raven does not receive a response from the IP address, it will make additional attempts according to a backoff algorithm before determining the Internet connection is not functioning.

properly. If it determines the connection is not functioning, the modem will then attempt to reconnect to TELUS to reestablish IP connectivity.

Configuring Keepalive

In AceManager, the Keepalive settings are part of the *Other* group.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	*IPING	Keepalive Ping Time	0	<input type="text"/>	
	*IPINGADDR	Keepalive Ping Address		<input type="text"/>	
COMMON	*MSCIUPDADDR	Status Update Address	/0	<input type="text"/>	
Misc	*MSCIUPDPERIOD	Status Update Period (Seconds)	0	<input type="text"/>	
USB	*TPORT	AT Telnet Port	2332	<input type="text"/>	
Serial	*TELNETTIMEOUT	AT Telnet Port Timeout (Minutes)	2	<input type="text"/>	
TCP	DAE	Disable AT Escape	0	<input type="text"/>	
UDP	*DATZ	Disable ATZ Reset	0	<input type="text"/>	
DNS	*SNTP	Enable time update	0	<input type="text"/>	
Dynamic IP	*SNTPADDR	SNTP Server Address		<input type="text"/>	
PPP/Ethernet	*NETWDOG	Network Connection Wait	20	<input type="text"/>	
PassThru	*SNMPPORT	SNMP Port	0	<input type="text"/>	
SMTP	*SNMPSECLVL	SNMP Security Level	0	<input type="text"/>	
Other	*SNMPTRAPDEST	SNMP Trap Destination IP	/0	<input type="text"/>	
Low Power	*SNMPCOMMUNITY	SNMP Community String	public	<input type="text"/>	
Friends					
LOGGING					

Figure 6-7: AceManager : Other

- ***IPING** sets the interval, in minutes, you want Keepalive to test the network connection. To disable Keepalive, set *IPING to 0 (default setting).

*Note: 15 minutes is the minimum time which can be set for Keepalive. If you set *IPING for a value less than the minimum, the minimum value will be set.*

- ***IPINGADDR** sets the IP address you want to use for the connection test.

Caution: If *IPINGADDR is left blank or is set to an invalid IP address (example, an IP which is unreachable or one which is not a valid IP address), modem performance will be adversely affected.

Data usage using Keepalive

Keepalive is an optional feature. If you frequently pass data with your modem, you most likely do not need to have Keepalive enabled. When using Keepalive, be aware that a ping moves approximately 66 bytes of data over the network

and is billable by TELUS. The following *IPPING settings will incur approximate monthly data usage in addition to any other data usage:

*IPPING	Estimated Usage
15 minutes	400k / month
30 minutes	200k / month
60 minutes	100k / month
120 minutes	50k / month

>> 7: IP Manager

- Understanding Domain Names
- Using IP Manager with your Raven
- Understanding DNS

If you have a fleet of Sierra Wireless AirLink modems or even if you only have one, it can be difficult to keep track of the current IP addresses, especially if the addresses aren't static but change every time the modems connect to Provider. If you need to connect to a modem, or the device behind it, it is so much easier when you have a domain name (car54.mydomain.com, where are you?).

Reasons to contact the modem and/or the connected device:

- Requesting a location update from a delivery truck.
- Contacting a surveillance camera to download logs or survey a specific area.
- An oil derrick that needs to be triggered to begin pumping.
- Sending text to be displayed by a road sign.
- Updating the songs to be played on a juke box.
- Updating advertisements to be displayed in a cab.
- Remote access to a computer, a PLC, an RTU, or other system.
- Monitoring and troubleshooting the status of the modem itself without needing to bring it in or go out to it.

A dynamic IP address is suitable for many Internet activities such as web browsing, looking up data on another computer system, data only being sent out, or data only being received after an initial request (also called Mobile Originated). However, if you need to contact Raven directly, a device connected to the modem, or a host system using your Raven (also called Mobile Terminated), a dynamic IP won't give you a reliable address to contact (since it may have changed since the last time it was assigned).

Domain names are often only connected to static IP addresses because of the way most domain name (DNS) servers are set-up. Dynamic DNS servers require notification of IP Address changes so they can update their DNS records and link a dynamic IP address to the correct name.

- Dynamic IP addresses are granted only when your Raven is connected and can change each time the modem reconnects to the network.
- Static IP addresses are granted the same address every time your Raven is connected and are not in use when your modem is not connected.

Since many cellular providers, like wire-based ISPs, do not offer static IP addresses or static address accounts cost a premium vs. dynamic accounts, Sierra Wireless AirLink Solutions developed IP Manager to work with a Dynamic DNS server to receive notification from Sierra Wireless AirLink modems to translate the modem's dynamic IP address to a fully qualified domain name. Thus, you can contact your Raven directly from the Internet using a domain name.

Understanding Domain Names

A domain name is a name of a server or device on the Internet which is associated with an IP address. Similar to how the street address of your house is one way to contact you and your phone number is another, both the IP address and the domain name can be used to contact a server or device on the Internet. While contacting you at your house address or with your phone number employ different methods, using a domain name instead of the IP address actually uses the same method, just a word based name is commonly easier to remember for most people than a string of numbers.

Understanding the parts of a domain name can help to understand how IP Manager works and what you need to be able to configure the modem. A fully qualified domain name (FQDN) generally has several parts.

- **Top Level Domain (TLD):** The TLD is the ending suffix for a domain name (.com, .net, .org, etc.)
- **Country Code Top Level Domain (ccTLD):** This suffix is often used after the TLD for most countries except the US (.ca, .uk, .au, etc.)
- **Domain name:** This is the name registered with ICANN (Internet Corporation for Assigned Names and Numbers) or the registry for a the country of the ccTLD (i.e. if a domain is part of the .ca TLD, it would be registered with the Canadian domain registry). It is necessary to have a name registered before it can be used.
- **Sub-domain or server name:** A domain name can have many sub-domain or server names associated with it. Sub-domains need to be registered with the domain, but do not

need to be registered with ICANN or any other registry. It is the responsibility of a domain to keep track of its own subs.

car54.mydomain.com

- **.com** is the TLD
- **mydomain** is the domain (usually noted as mydomain.com since the domain is specific to the TLD)
- **car54** is the subdomain or server name associated with the device, computer, or modem registered with mydomain.com

car54.mydomain.com.ca

This would be the same as above, but with the addition of the country code. In this example, the country code (.ca) is for Canada.

Tip: A URL (Universal Resource Locator) is different from a domain name in that it also indicates information on the protocol used by a web browser to contact that address, such as `http://www.sierrawireless.com`. `www.sierrawireless.com` is a fully qualified domain name, but the `http://`, the protocol identifier, is what makes the whole thing a URL.

Dynamic Names

When an IP address is not expected to change, the DNS server can indicate to all queries that the address can be cached and not looked up for a long period of time. Dynamic DNS servers, conversely, have a short caching period for the domain information to prevent other Internet sites or queries from using the old information. Since the IP address of a modem with a dynamic account can change frequently, if the old information was used (such as with a DNS server which indicates the address can be cached for a long period of time) when the IP address changed, the domain would no longer point to the new and correct IP address of the modem.

If your Raven is configured for Dynamic IP, when it first connects to the Internet, it sends a IP change notification to IP Manager. IP Manager will acknowledge the change and update the Dynamic DNS server. The new IP address will then be the address for your modem's configured name.

Once your modem's IP address has been updated in IP Manager, it can be contacted via name. If the IP address is needed, you can use the domain name to determine the IP address.

Note: The fully qualified domain name of your Raven will be a subdomain of the domain used by the IP Manager server.

Using IP Manager with your Raven

To allow your Sierra Wireless AirLink modem to be addressed by name, the modem needs to have a minimum of three elements configured. You can also configure a second dynamic server as a backup, secondary, or alternate server.

In AceManager, select *Dynamic IP*.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	*MODEMNAME	Modem Name	603eea33		
COMMON	*DOMAIN	Domain			
Misc	*IPMANAGER1	IP Manager Server 1 (IP Adrs)			
Serial	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0		
TCP	*IPMGRKEY1	IPMServer1 Key	*****		
UDP	*IPMANAGER2	IP Manager Server 2 (IP Adrs)			
DNS	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0		
Dynamic IP	*IPMGRKEY2	IPMServer2 Key	*****		
PPP/Ethernet					
PassThru					
SMTP					
Other					
Friends					
LOGGING					

Figure 7-1: AceManager: Dynamic IP

- ***MODEMNAME** : The name you want for the modem. There are some restrictions listed below for the modem name.
- ***DOMAIN** : The domain name to be used by the modem. This is the domain name of the server configured for *IPMANAGER1.
- ***IPMANAGER1** : The IP address or domain name of the dynamic DNS server which is running IP Manager.
- ***IPMANAGER2** : The secondary server for the domain. While it is optional to have two servers configured, it is highly recommended.

Tip: You can use a domain name instead of the IP address for your IP Manager servers if you have DNS set up in your Raven.

- ***IPMGRUPDATE1** and ***IPMGRUPDATE2**: How often, in minutes, you want the address sent to IP Manager. If this is set to zero, the modem will only send an update if

the IP address changes (example, if your Raven is reset or is assigned a different IP address).

- ***IPMGRKEY1** and ***IPMGRKEY2**: User defined password key which is used instead of AirLink secret key when using an IP Manager server other than the one provided by Sierra Wireless.

Restrictions for Modem Name

For the Modem Name, you should use something which is unique but also easy to remember. Your company name or the intended function of the modem are recommended. If you have more than one modem and want to name them the same, you can append a number for each. Since it is an Internet domain name, there are some restrictions for the name.

- Must begin with a letter or number
- Can include a hyphen (-)
- Cannot contain spaces
- Must be no longer than 20 characters total

Data Usage for IP Manager Server Updates

The IP Manager update is a small packet sent to the server with a response sent back to the modem. If you have *IPMGRUPDATE1 or *IPMGRUPDATE2 set to any number but zero, the modem will send the update not only when it receives a new IP address but at the time interval as well. The data traffic could be billed by your carrier.

Each update is a total of 68 bytes from the modem with a 50 byte total response from the server for a round trip update of 118 bytes.

interval (minutes)	total bytes per day (24 hours)
10	16992 bytes
30	5664 bytes
60	2832 bytes
500	339.84 bytes

Eairlink.com

As a service, Sierra Wireless maintains a IP Manager servers which can be used for any AirLink modem.

Note: The IP Manager service from Sierra Wireless is currently not a guaranteed service though every effort is made to keep it operational 24/7.

- ***DOMAIN** : eairlink.com
- ***IPMANAGER1** : edns2.eairlink.com
- ***IPMANAGER2** : eairlink.com

Tip: When using the IP Manager service offered by Sierra Wireless, since there are many modems using the service, it is even more imperative to have a unique name for your modem.

Understanding DNS

The Raven has the ability to query DNS servers in order to translate domain names into IP addresses. This allows you to use domain names in place of IP addresses for most of the configuration options requiring IP addresses. This is important if your Raven will need to contact another modem or other device that has a domain name but an unknown or dynamic IP address (such as another remote Raven using IP Manager).

Configuring DNS

Generally, when your Raven receives its IP address from Provider as part of the connection process, it will also receive the DNS servers to use for resolving (or translating) names to IP addresses which it will automatically configure in the modem settings. Unless your Raven will be used on a network with other modems or devices which have names internal to the local network or frequently changing IP addresses, the DNS servers provided by Provider should be all you need.

If the Raven will be communicating with a device that has a domain name but changes its IP address frequently (such as another AirLink modem using IP Manager) or is on a network where devices are accessed by names rather than IP addresses, you will want to put in an alternate DNS (*DNSUSER) where that domain is updated, such as the IP Manager server the remote modem is using or the listing of IP addresses to names is kept.

If you need to manually configure DNS, in AceManager, select *DNS*.

GROUPS		MODEM DATA		PRINTABLE VIEW
INFO STATUS COMMON Misc Serial TCP UDP DNS Dynamic IP	AT	Name	Value	New Value
	*DNS1	Modem DNS Server 1	68.28.58.11	
	*DNS2	Modem DNS Server 2	68.28.50.11	
	*DNSUSER	Use Alternate DNS	0.0.0.0	
	*DNSUPDATE	DNS Updates	0	

Figure 7-2: AceManager: DNS

- ***DNS1** and ***DNS2** - The primary and secondary DNS servers set by Provider when your Raven gets its IP address.
- ***DNSUSER** - Set this, if desired, to an additional DNS server to query first before the primary or secondary (just as a hosts file is queried first on a computer). If ***DNSUSER** is set to 0.0.0.0, it will be ignored.
- ***DNSUPDATE** - This command sets how often you want DNS Updates to be requested. Otherwise the Raven will only send updates when it is reset, powered up, or the IP address is granted by network changes.

The “PPP-Peer” Domain Name

The Raven uses the unqualified domain name of “ppp-peer” when it is in PPP or SLIP address mode to resolve the address of the device or computer connected via PPP or SLIP address. If the Raven is not in PPP or SLIP address mode, “ppp-peer” will resolve to 0.0.0.0.

8: Configuring Modbus/BSAP

- Configuring the Raven at the Polling Host for Modbus on UDP
- Configuring the Remote Ravens for Modbus with UDP

The Raven supports Modbus ASCII, Modbus RTU, BSAP, and can also emulate other protocols like DF1 or others using its Modbus Variable feature.

Modbus Overview

The Modbus Protocol, developed by Modicon in 1979, provides for client-server (also referred to as master-slave) communications between intelligent devices. As a de facto standard, it is the most widely used network protocol in the industrial manufacturing environment to transfer discrete/analog I/O and register data between control devices. Modbus, BSAP, and other Modbus variations are often used in conjunction with telemetry devices.

Tip: This section is just a brief overview of Modbus. For more information, refer to your Modbus equipment distributor or manufacturer or <http://www.modbus.org>.

Telemetry

Telemetry is an automated communications process by which data is collected from instruments located at remote or inaccessible points and transmitted to receiving equipment for measurement, monitoring, display, and recording. Transmission of the information may be over physical pairs of wires, telecommunication circuits, radios or satellite.

Remote Terminal Unit (RTU)

Modbus was originally designed to be used in a radio environment where packets are broadcast from a central station (also called master or host) to a group of remote units. Each remote unit, Remote Terminal Unit (RTU), has a hexadecimal identification number (ID). The first part of the broadcast packet contains an RTU ID which corresponds to the ID of one of the remote units. The Modbus host looks for the ID and sends to only the unit with the matching ID. The RTU would then reply back to the central station.

The RTU connects to physical equipment such as switches, pumps, and other devices and monitors and controls these devices. The RTU can be part of a network set up for Supervisory Control and Data Acquisition.

Supervisory Control and Data Acquisition (SCADA)

Supervisory Control and Data Acquisition (SCADA) describes solutions across a large variety of industries and is used in industrial and engineering applications to monitor and control distributed systems from a master location. SCADA encompasses multiple RTUs, a central control room with a host computer (or network), and some sort of communication infrastructure.

SCADA allows for “supervisory” control of remote devices as well as acquiring data from the remote locations. Programmable Logic Controllers allow for a higher degree of automated SCADA.

Programmable Logic Controller (PLC)

A Programmable Logic Controller (PLC) is a small industrial computer which generally monitors several connected sensor inputs and controls attached devices (motor starters, solenoids, pilot lights/displays, speed drives, valves, etc.) according to a user-created program stored in its memory. Containing inputs and outputs similar to an RTU, PLCs are frequently used for typical relay control, sophisticated motion control, process control, Distributed Control System and complex networking.

Modbus TCP/IP

Modbus TCP/IP simply takes the Modbus instruction set and wraps TCP/IP around it. Since TCP/IP is the communications standard for the Internet and most networked computers, this provides a simpler installation. Modbus TCP/IP uses standard Ethernet equipment.

Raven Modbus on UDP

When Sierra Wireless AirLink modems are used in place of radios, a Raven is connected to the central station (host) and aRaven is connected to each remote unit. When the Raven is configured for Modbus with UDP, the Raven connected to the host can store a list of IP addresses or names with matching IDs. When the host at the central station sends serial data as a poll request, the Raven at the host matches the RTU ID to a corresponding IP of a Raven at a remote unit. A UDP packet is assembled encapsulating the RTU ID and serial data transmitted from the host. The UDP packet is then transmitted to the specific Raven at the remote unit matching the RTU ID.

The remote Raven then disassembles the packet before transmitting the RTU ID and serial data to the remote unit. The remote units operate in normal UDP mode and their data is sent to the host via the remote Raven and host Raven.

Configuring the Raven at the Polling Host for Modbus on UDP

This section covers a Polling Host with standard Modbus, variations may need additional AT commands.

1. Configure the listening/device ports

In AceManager, select *Misc* in the side menu.

GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*DATE	Date and Time	07/26/2007 23:06:29	
COMMON	OPRG	Enable Over-the-Air Programming	1	
Misc	*NETPHONE	Phone Number		
Serial	*STATICIP	Force Static IP	0.0.0.0	
TCP	*DPORT	Device Port	12345	
UDP	*NETUID	Network User ID	@	
DNS	*NETPW	Network Password	sprintpcs	
Dynamic IP	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	
PPP/Ethernet	*NETROAMPREF	Network Roaming Preference	99	
PassThru	*STATUSCHK	Checking SMS Status (Seconds)	0	
SMTP	*HOSTPAP	Request PAP	0	
Other	S53	Destination Address		
Friends	S53	Destination Port	0	
	S53	Default Dial Code	T	
LOGGING				
TELEMETRY				
ADDR LIST				

Figure 8-1: AceManager: Misc

The destination port for the modem at the host needs to match the device port (*DPORT) in use on all the modems at the remote sites. For example, if the remote modem's device port (*DPORT) is "12345", then the Modbus host modem's S53 destination port should be set to "12345".

Take note of (or set) the Device Port setting in *DPORT to configure the destination port on the remote modems.

2. Configure the default mode for start-up.

In AceManager, select *UDP* in the side menu. Select the appropriate *MD* mode from the drop down menu.

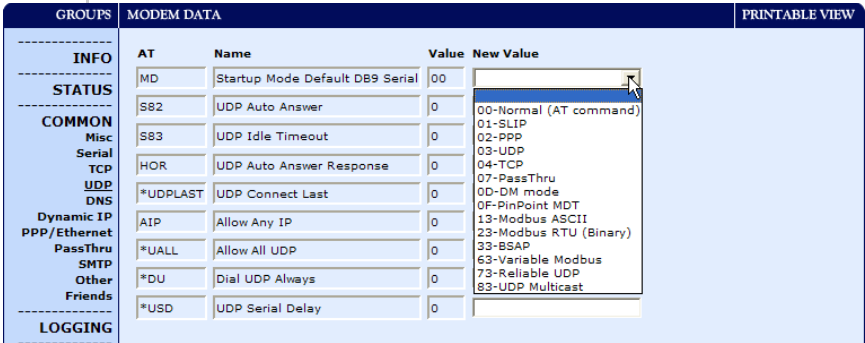


Figure 8-2: AceManager: UDP - MD

- MD13: Modbus ASCII
- MD23 : Modbus RTU (Binary)
- MD33: BSAP
- MD63: Variable Modbus - individual parameters are set up manually.

3. Configure IP addresses for the Modbus IDs.

The last step of configuring the modem at the host is setting the IDs to their specific IPs. In AceManager, select the menu option *Addr List*.

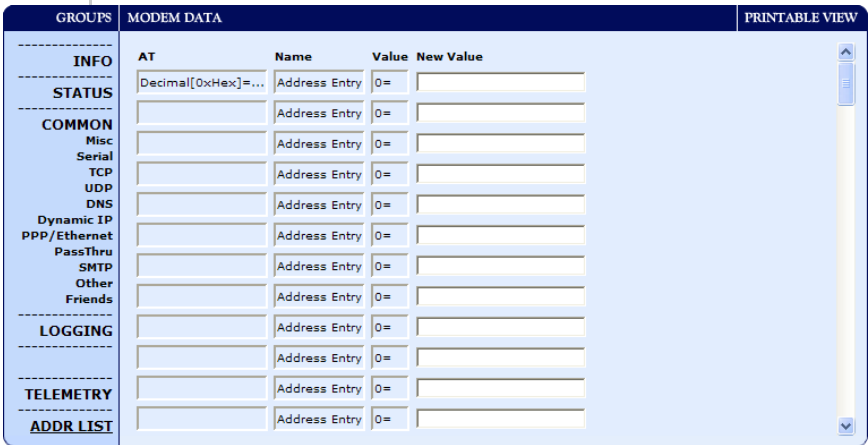


Figure 8-3: AceManager: Addr List.

Addresses can be entered in decimal or hex. AceManager will translate hex entries into decimal. The number before the "=" is ID, the number after is the IP address. There can be a total of 100 remote ID/Local addresses entered into the modem.

When using AT commands via telnet or direct serial connection, use ATMLIST for decimal IDs and ATMLISTX for hexadecimal. For example, if the ID is 27 and the IP is 123.123.123.124, you would enter it as ATMLIST27=123.123.123.124 or ATMLISTX1B=123.123.123.124.

4. Optional: Dynamic IP Address

If you do not have a static IP, the host modem should be configured to report its current IP to a Dynamic DNS (DDNS) server with IP Manager.

In the Host modem's configuration, instead of IP address for the Addr List (ATMLIST or ATMLISTX), substitute a single unique name for each modem, i.e. remote1, remote2, etc.

When you configure IP Manager for the host modem, make note of your modem name and domain setting in AceManager in the menu selection *Dynamic IP* to be used with the remote modems.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	*MODEMNAME	Modem Name	603eea33		
COMMON	*DOMAIN	Domain			
Misc	*IPMANAGER1	IP Manager Server 1 (IP Adrs)			
Serial	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0		
TCP	*IPMGRKEY1	IPMServer1 Key	*****		
UDP	*IPMANAGER2	IP Manager Server 2 (IP Adrs)			
DNS	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0		
Dynamic IP	*IPMGRKEY2	IPMServer2 Key	*****		
PPP/Ethernet					
PassThru					
SMTP					
Other					
Friends					
LOGGING					

Figure 8-4: AceManager: Dynamic IP

With names instead of IP addresses for the Address List, the host modem will query the DNS server for the current IP address assigned to the specific name of a remote modem to send a message corresponding to the ID.

When you use names instead of IP addresses, to ensure your modems are updated quickly with the correct IP addresses for the names, you will want to set the DNS settings as well. In AceManager, select *DNS*.

GROUPS		MODEM DATA		PRINTABLE VIEW	
INFO		AT	Name	Value	New Value
STATUS		*DNS1	Modem DNS Server 1	68.28.58.11	
		*DNS2	Modem DNS Server 2	68.28.50.11	
COMMON		*DNSUSER	Use Alternate DNS	0.0.0.0	
Misc		*DNSUPDATE	DNS Updates	0	
Serial					
TCP					
UDP					
DNS					
Dynamic IP					

Figure 8-5: AceManager: DNS

Configure *DNSUSER to the same IP address as the IP Manager (*IPMANAGER1). If your modems have dynamic IP addresses and not static (the IP address can change when it is powered up), configure *DNSUPDATE to a low interval to allow frequent updates.

Configuring the Remote Ravens for Modbus with UDP

This section covers standard Modbus settings for the Raven at the remote unit, variations may need additional commands.

1. Configure the ports

In AceManager, select *Misc* in the side menu.

GROUPS		MODEM DATA		PRINTABLE VIEW	
INFO		AT	Name	Value	New Value
STATUS		*DATE	Date and Time	07/26/2007 23:06:29	
		OPRG	Enable Over-the-Air Programming	1	
COMMON		*NETPHONE	Phone Number		
Misc		*STATICIP	Force Static IP	0.0.0.0	
Serial		*DPORT	Device Port	12345	
TCP		*NETUID	Network User ID	@	
UDP		*NETPW	Network Password	sprintpcs	
DNS		*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	
Dynamic IP		*NETROAMPREF	Network Roaming Preference	99	
PPP/Ethernet		*STATUSCHK	Checking SMS Status (Seconds)	0	
PassThru		*HOSTPAP	Request PAP	0	
SMTP		S53	Destination Address		
Other		S53	Destination Port	0	
Friends		S53	Default Dial Code	T	
LOGGING					
TELEMETRY					
ADDR LIST					

Figure 8-6: AceManager: Misc

Note: With a name instead of IPs for the host modem, the remote modems will query the DNS server for the current IP assigned to the host modem before sending data back to the host.

The destination port for the modem at the host needs to match the device port in use on all the modems at the remote sites. For example, if the remote modem's device port (see below) is "12345", then the Modbus host modem's S53 destination port should be set to "12345".

Set the destination port (S53) to match the device port of the host modem (*DPORT). Make sure the device port of the remote modem (*DPORT) matches the destination port of the host modem (S53).

2. Configure IP addresses for the host.

If the Host modem has a static IP address, enter it in the Destination Address for S53.

If the modem at the host has a dynamic IP and is using IP Manager, instead of an IP address for S53, specify the name of the host modem (*MODEMNAME). If the remote modems are using a different DDNS than the host modem, you will need to specify the fully qualified domain name (*MODEMNAME+*DOMAIN).

*Note: Setting the Host modem IP address as the S53 Destination Address provides a low level security. The modem will not forward UDP traffic unless the source IP/port matches what is in S53. However, if you set *AIP=1, the modem will forward UDP traffic from any source IP address as long as it is accessing the modem on the configured *DPORT.*

3. Configure the default mode for start-up.

Each modem at the remote locations will need to be configured to communicate with the modem at the host. In AceManager, select *UDP* in the side menu.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	MD	Startup Mode Default DB9 Serial	00	<input type="text"/>	
COMMON	S82	UDP Auto Answer	0	<input type="text"/>	
	S83	UDP Idle Timeout	0	<input type="text"/>	
	HOR	UDP Auto Answer Response	0	<input type="text"/>	
	*UDPLAST	UDP Connect Last	0	<input type="text"/>	
	AIP	Allow Any IP	0	<input type="text"/>	
	*UALL	Allow All UDP	0	<input type="text"/>	
	*DU	Dial UDP Always	0	<input type="text"/>	
	*USD	UDP Serial Delay	0	<input type="text"/>	
	Dynamic IP				
	PPP/Ethernet				
PassThru					
SMTP					
Other					
Friends					
LOGGING					

Figure 8-7: AceManager: UDP

- a. Enable S82, UDP auto answer.
- b. Set S83 to the idle time-out applicable to your application, commonly 20.

4. Configure other RTU settings.

Other parameters may need to be changed, but this is dependent on the RTU type being used. As a minimum, this typically involves setting the proper serial settings to match your RTU.

5. Optional: Dynamic IP Address

If you do not have a static IP, the host modem should be configured to report its current IP to a Dynamic DNS (DDNS) server with IP Manager.

You will need to match the name of the modem to the names specified in the host modem’s MLIST or MLISTX for the connected RTU.

When you configure IP Manager for the host modem, make note of your modem name and domain setting in AceManager in the menu selection *Dynamic IP* to be used with the remote modems.

AT	Name	Value	New Value
*MODEMNAME	Modem Name	603eea33	
*DOMAIN	Domain		
*IPMANAGER1	IP Manager Server 1 (IP Adrs)		
*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0	
*IPMGRKEY1	IPMServer1 Key	*****	
*IPMANAGER2	IP Manager Server 2 (IP Adrs)		
*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0	
*IPMGRKEY2	IPMServer2 Key	*****	

Figure 8-8: AceManager: Dynamic IP

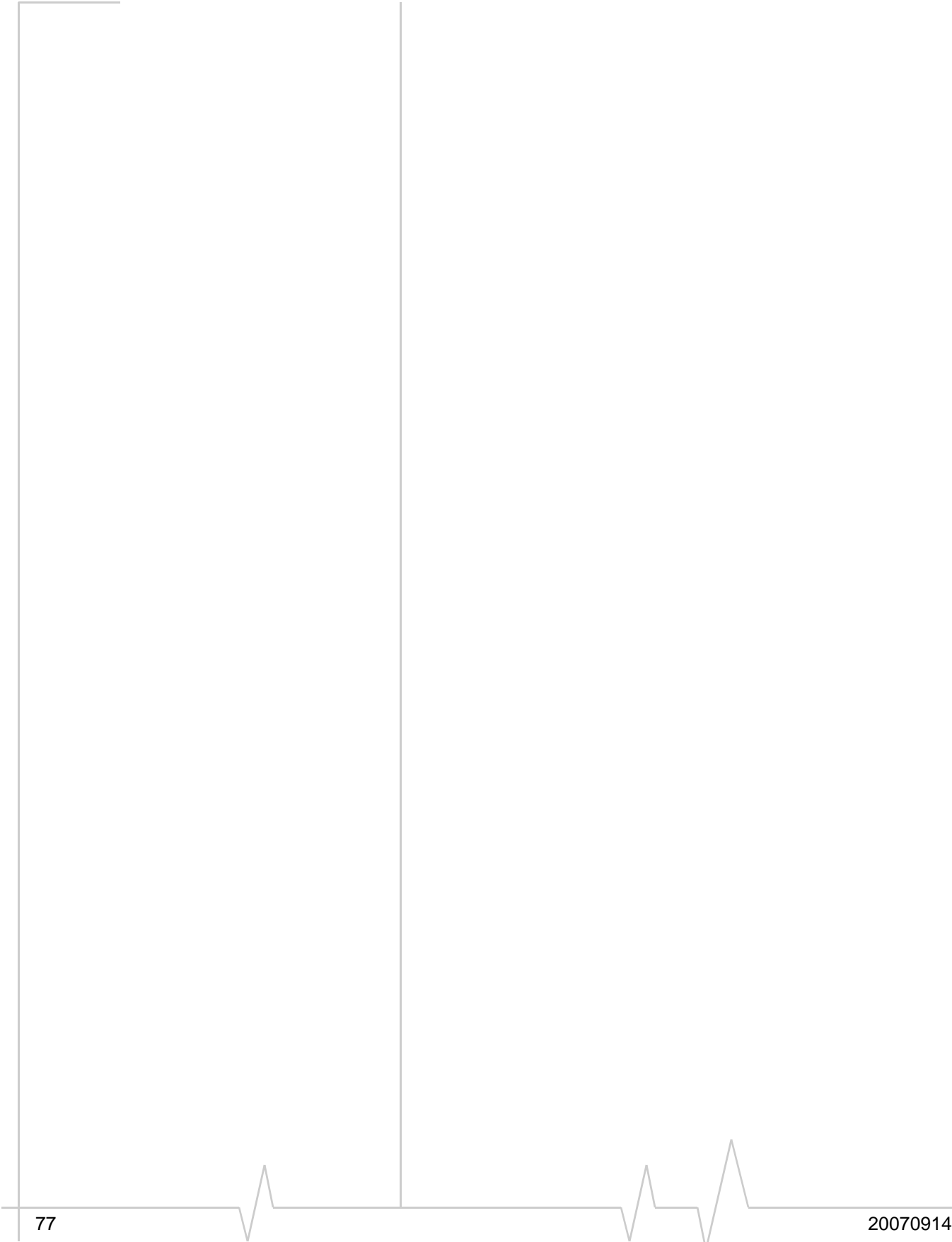
When you use names instead of IP addresses, to ensure your modems are updated quickly with the correct IP addresses for the names, you will want to set the DNS settings as well. In AceManager, select *DNS*.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO					
STATUS					
COMMON					
Misc					
Serial					
TCP					
UDP					
DNS					
Dynamic IP					

AT	Name	Value	New Value
*DNS1	Modem DNS Server 1	68.28.58.11	
*DNS2	Modem DNS Server 2	68.28.50.11	
*DNSUSER	Use Alternate DNS	0.0.0.0	
*DNSUPDATE	DNS Updates	0	

Figure 8-9: AceManager: DNS

Configure *DNSUSER to the same IP address as the IP Manager (*IPMANAGER1). If your modems have dynamic IP addresses and not static (the IP address can change when it is powered up), configure *DNSUPDATE to a low interval to allow frequent updates.



>> 9: SNMP : Simple Network Management Protocol

- [SNMP Configuration](#)
- [SNMP MIB Definition Sample](#)

The Simple Network Management Protocol (SNMP) was designed to allow remote management and monitoring of a variety of devices from a central location. The SNMP management system is generally composed of agents (such as your Raven, a router, a UPS, a web server, a file server, or other computer equipment) and a Network Management Station (NMS) which monitors all the agents on a specific network. Using the management information base (MIB), an NMS can include reporting, network topology mapping, tools to allow traffic monitoring and trend analysis, and device monitoring.

Authentication ensures SNMP messages coming from the agent, such as the Raven, have not been modified and the agent may not be queried by unauthorized users. SNMPv3 uses a User-Based Security Model (USM) to authenticate and, if desired or supported, message encryption. USM uses a user name and password specific to each device.

The Raven can be configured as an SNMP agent and supports SNMPv2c and SNMPv3.

Management Information Base (MIB)

The management information base (MIB) is a type of database used to compile the information from the various SNMP agents. Reports from various agents, such as the Raven, are sent as data in form designed to be parsed by the NMS into its MIB. The data is hierarchical with entries addressed through object identifiers.

SNMP Traps

SNMP traps are alerts that can be sent from the managed device to the Network Management Station when an event happens. Your Raven is capable of sending the linkUp trap when the network connection becomes available.

SNMP Configuration

To configure your Raven to work as an SNMP agent, you can use either AceManager, or a terminal connection to configure the modem using AT commands. In AceManager, the SNMP commands are all part of the **Other** group under the **Common** group.

There are only three commands to set for SNMP in the Raven: the listening port, the security level, and the trap destination.

GROUPS	MODEM DATA		PRINTABLE VIEW
COMMON	*SNTP	Enable time update	0
	*SNTPADDR	SNTP Server Address	
	*NETWDOG	Network Connection Wait	20
	*SNMPPORT	SNMP Port	0
	*SNMPSECLVL	SNMP Security Level	0
	*SNMPTRAPDEST	SNMP Trap Destination IP	/0
	*SNMPCOMMUNITY	SNMP Community String	public

Figure 9-1: AceManager : Common > Other

Listening Port

*SNMPPORT sets the port for the SNMP agent to listen on. If set to zero, default, SNMP is disabled.

Tip: *SNMP generally uses port 161, however most Internet providers (including cellular) block all ports below 1024 as a security measure. You should be able to use a higher numbered port such as 10161.*

Security Level

*SNMPSECLVL sets the security level and which version of SNMP communications are used.

- **0** - No security required. SNMPv2c and SMNPv3 communications are allowed.
- **1** - Authentication required. SNMPv3 is required to do authentication and SNMPv2c transmissions will be silently discarded. Authentication is equivalent to the authNoPriv setting in SNMPv3.
- **2** - Authentication required and messages are encrypted. SNMPv3 is required to do authentication. SNMPv2c and SNMPv3 authNoPriv transmissions will be silently discarded. Authentication and encryption is equivalent to the authPriv setting in SNMPv3.

User Name and Password

The user name is '*user*'. The user name cannot be changed. The Raven's password is used as the SNMP password (default is '*12345*').

Tip: *The eight-character password requirement for SMNPv3 is not enforced by the PinPoint X Agent to allow the default password to function. Your SNMP administrator or MIS may require you to change to a more secure and/or longer password.*

To change the password in the Raven, select **Modem** from the top menu line in AceManager.

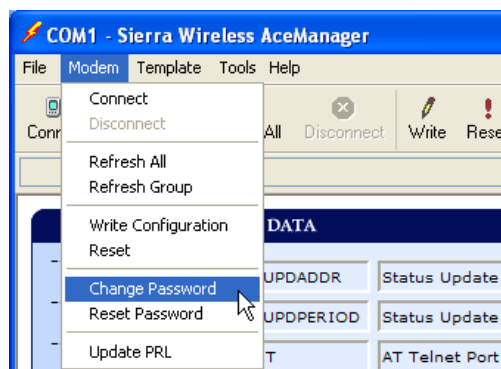


Figure 9-2: AceManager : Change Password menu option

The current password will be pre-entered. As you type the new password and confirm it, the characters you type will be obscured by "x". For the password, you can use numbers, letters, and/or punctuation.

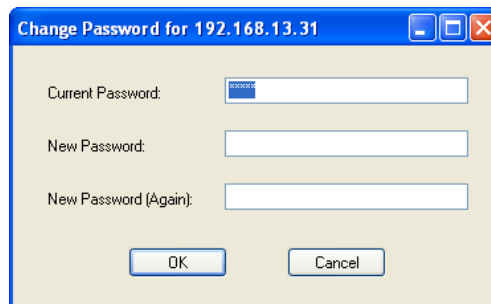


Figure 9-3: Change Password

Caution: *The password is case sensitive. "drowssaP" is not the same as "drowssap".*

Trap Destination

*SNMPTRAPDEST needs to be set with the destination IP and port. If either are set to zero or empty, SNMP traps are disabled.

Note: Traps are sent out according to the SNMP security level (i.e. if the security level is 2, traps will be authenticated and encrypted). Currently, the only trap supported is LinkUp.

Community String

The community string can be configured using *SNMPCOMMUNITY. The default is "public".

SNMP MIB Definition Sample

```

AIRLINK-MIB DEFINITIONS ::= BEGIN

IMPORTS
    ObjectName FROM SNMPv2-SMI
    MODULE-COMPLIANCE FROM SNMPv2-CONF;

org OBJECT IDENTIFIER ::= { iso 3 }
dod OBJECT IDENTIFIER ::= { org 6 }
internet OBJECT IDENTIFIER ::= { dod 1 }
private OBJECT IDENTIFIER ::= { internet 4 }
enterprises OBJECT IDENTIFIER ::= { private 1 }

airlink OBJECT IDENTIFIER ::= { enterprises 20542 }
general OBJECT IDENTIFIER ::= { airlink 1 }
common OBJECT IDENTIFIER ::= { airlink 2 }
status OBJECT IDENTIFIER ::= { airlink 3 }
gps OBJECT IDENTIFIER ::= { airlink 4 }

-- GENERAL --
phoneNumber OBJECT-TYPE
    SYNTAX DisplayString (SIZE (10))
    MAX-ACCESS read-only
    STATUS current
    ::= { general 1 }

deviceId OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    ::= { general 2 }

```

electronicID OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 3 }

modemType OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 4 }

aleosSWVer OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 5 }

aleosHWVer OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 6 }

modemSWVer OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 7 }

modemHWVer OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { general 8 }

-- COMMON --

date OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

::= { common 1 }

otaProgrammingEnable OBJECT-TYPE

SYNTAX INTEGER {

disabled(0),

enabled(1) }

MAX-ACCESS read-only

STATUS current
::= { common 2 }

devicePort OBJECT-TYPE
SYNTAX INTEGER(0..65535)
MAX-ACCESS read-only
STATUS current
::= { common 3 }

netUID OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { common 4 }

netPW OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { common 5 }

requestPAP OBJECT-TYPE
SYNTAX INTEGER {
no(0),
yes(1) }
MAX-ACCESS read-only
STATUS current
::= { common 6 }

destinationAddress OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { common 7 }

destinationPort OBJECT-TYPE
SYNTAX INTEGER(0..65535)
MAX-ACCESS read-only
STATUS current
::= { common 8 }

serialPortSettings OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { common 9 }

serialPortFlowControl OBJECT-TYPE
SYNTAX INTEGER {


```
none(0),
hardware(2),
software(4) }
MAX-ACCESS read-only
STATUS current
::= { common 10 }

-- STATUS --
ipAddress OBJECT-TYPE
SYNTAX IPAddress
MAX-ACCESS read-only
STATUS current
::= { status 1 }

netState OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { status 2 }

netChannel OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
::= { status 3 }

rssi OBJECT-TYPE
SYNTAX INTEGER(-125..-50)
MAX-ACCESS read-only
STATUS current
::= { status 4 }

serialSent OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
::= { status 5 }

serialReceived OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
::= { status 6 }

hostMode OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { status 7 }
```

powerMode OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { status 8 }

fixObtained OBJECT-TYPE
SYNTAX INTEGER {
no(0),
yes(1) }
MAX-ACCESS read-only
STATUS current
 ::= { gps 1 }

satelliteCount OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
 ::= { gps 2 }

latitude OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { gps 3 }

longitude OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { gps 4 }

END

Display Responses

The string that is displayed for these objects is the same display for the corresponding AT Command.

Object	AT Command
phoneNumber	*NETPHONE?
deviceId	*DEVICEID?
electronicID	I3
aleosSWVer	I1

Object	AT Command
aleosHWVer	I1
modemSWVer	I2
modemHWVer	I2
date	*DATE?
otaProgrammingEnable	OPRG?
devicePort	*DPORT?
netUID	*NETUID?
netPW	*NETPW?
requestPAP	*HOSTPAP?
destinationAddress	S53
destinationPort	S53
serialPortSettings	S23
serialPortFlowControl	\Q
ipAddress	*NETIP?
netState	*NETSTATE?
netChannel	*NETCHAN?
rssi	*NETRSSI?
serialSent	<i>not applicable for Raven-E</i>
serialReceived	<i>not applicable for Raven-E</i>
hostMode	*HOSTMODE?
powerMode	*POWERMODE? <i>PinPoint line modems only</i>
fixObtained	<i>PinPoint line modems only</i>
satelliteCount	<i>PinPoint line modems only</i>
latitude	<i>PinPoint line modems only</i>
longitude	<i>PinPoint line modems only</i>

Product ID

Each modem type has a unique ID associated with it so you can more easily identify the modem from its type on your network.

>> A: Configuration Commands

- [Info \(information\)](#)
- [Status](#)
- [Common](#)
- [Logging](#)
- [Telemetry/Addr List](#)

The configuration commands (AT commands) in this chapter are arranged according to their placement in AceManager.

The commands available in AceManager will depend of the model number of your Raven and, in some cases, the version of the ALEOS firmware installed.

Note: Some commands can only be configured using a terminal emulation and typed AT commands. Some commands also require PassThru mode.

Tip: You can use a fully qualified domain name instead of an IP address for most configuration options calling for an IP address if your Raven is configured to use DNS. DNS settings frequently come directly from TELUS while your Raven is registering on the cellular network and receiving it's IP address.

Info (information)

The commands in the “Info” group have read-only parameters. They only provide information about the modem. Some of the information displayed in this group does not correspond directly to AT commands.

GROUPS	MODEM DATA			PRINTABLE VIEW
----- INFO ----- STATUS ----- COMMON Misc USB Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other Low Power Friends ----- LOGGING ----- PINPOINT ----- 1X/EV-DO ----- I/O	AT	Name	Value	
	*NETPHONE	Phone Number	9133784772	
	*DEVICEID	Device ID	0x000003910039C044	
		Modem EID/IMEI	603C6298	
	*ETHMAC	Ethernet Mac Address	00143E004245	
		Modem Type	PinPoint X EV-DO	
		Modem Name	603c6298	
	I1	ALEOS Software Version	V4321_3.1.3.059 Mar 29 2007	
		Modem Hardware Configuration	090d0004000300000000000000000000	
		Modem Software Version	p2005001,20224 [Sep 21 2006 15:43:22],, VID: PID:	
		Modem Hardware Version	MC5725 Rev 2.0 (2)	
		Boot Version	3.0.4	
		MSCI Version	5	

Figure 1-1: AceManager : Info

***DEVICEID?**

The 64-bit device ID the modem uses to identify itself to the cellular network.

***NETPHONE?**

The modem's phone number, if applicable or obtainable.

&V

View active profile, the contents of the active registers. *Not displayed with AceManager.*

In

- **n=0** : Product name (for example, Raven).
- **n=1** : The Raven's firmware (ALEOS) version, hardware ID, and copyright.
- **n=2** : The internal hardware's firmware version and relevant hardware ID.
- **n=3** : The hardware module's unique identification number or serial number.
- **n=5** : View active profile (the contents of the active registers). *Not displayed with AceManager.*

Information Displayed in AceManager without AT Commands Listed

- **Versions of ALEOS, internal hardware, boot, and MSCI:** Versions of internally configured hardware and software.

Status

Most of the commands in the “Status” group have read-only parameters and provide information about the modem. The Status Group has more fields that can be displayed on most screens. You can either resize your window or use the scroll bar on the side to display the remainder.

GROUPS	MODEM DATA		PRINTABLE VIEW
INFO	AT	Name	Value
STATUS	*NETIP	Network IP	0.0.0.0
COMMON	*NETSTATE	Network State	Connecting To Network
Misc	*NETCHAN	Channel	0
USB	*NETRSSI	RSSI (dBm)	0
Serial		Host Mode	PPP
TCP		Host Signl Level	DCD: HIGH DTR: HIGH DSR: HIGH CTS: HIGH RTS: HIGH
UDP			
DNS			
Dynamic IP	*NETERR	Network Error Rate	255
PPP/Ethernet		Network Bytes Sent	0
PassThru		Network Bytes Rcvd	0
SMTP		Host Serial Bytes Sent	389
Other		Host Serial Bytes Rcvd	660
Low Power		Network IP Packets Sent	0
Friends		Network IP Packets Rcvd	0
LOGGING		Host IP Packets Sent	2
PINPOINT		Host IP Packets Rcvd	4
1X/EV-DO			
I/O			

Figure 1-2: AceManager : Status

*HOSTMODE?

The current host mode (AT, PPP, UDP, etc.). If the Raven is not in AT mode, telnet into the modem to execute this command.

*NETIP?

The current IP address of the modem reported by the internal module, generally obtained from TELUS. This is the address can contact the Raven from the Internet.

Tip: Use `*NETALLOWZEROIP` if you need to allow the display of an IP ending in a zero.

*NETOP?

The current cellular carrier from the modem's firmware version, for example, TELUS.

*NETRSSI?

The current RSSI (Receive Signal Strength Indicator) of the Raven as a negative dBm value.

Note: If there is no current network IP address, 0.0.0.0 may be displayed.

Tip: The same information is displayed with the command *S202?*.

***NETSERV?**

The type of service being used by the modem, for example Tech.

***NETSTATE?**

The current network state:

- **Connecting To Network:** The Raven is in the process of trying to connect to the cellular network.
- **Network Authentication Fail:** Authentication to the cellular network has failed. Verify settings to activate the Raven.
- **Data Connection Failed:** The Raven failed to connect, and it is now waiting a set time interval before it attempts to reconnect. Verify settings to activate the Raven.
- **Network Negotiation Fail:** Network connection negotiation failed. This is usually temporary and often clears up during a subsequent attempt.
- **Network Ready:** The Raven is connected to the 1x cellular network and ready to send data.
- **Network Dormant:** The Raven is connected to the 1x cellular network, but the link is dormant. It will be woken up when data is sent or received.
- **No Service:** There is no cellular network detected.
- **Hardware Reset:** The internal module is being reset. This is a temporary state.

+WPNEI

The current IP address of the modem reported by the internal module, generally obtained from TELUS. This is the address can contact the Raven from the Internet. .

Note: If there is no current network IP address, 0.0.0.0 may be displayed.

Information Displayed in AceManager without AT Commands Listed

- **Bytes and Packets Received and Sent:** Network traffic for the applicable port.

- **Number of System Resets:** Counter of the number of system resets over the life of the modem or since the configuration was reset.
- **Bad Password Count:** Counter of the number of bad password attempts.
- **IP Reject Count or Log:** Rejected IP Data.
- **Temperature of the Internal Hardware Module:** The temperature of the internal radio module.

AT Commands Requiring PassThru mode

These commands are not displayed in AceManager.

Common

The groups under the heading Common encompass those commands that are common to most Sierra Wireless AirLink modems.

Misc (Miscellaneous)

The commands of the “Misc” group are a variety of commands that don’t directly fit in other categories.

GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*DATE	Date and Time	07/09/2007 16:31:12	
COMMON	OPRG	Enable Over-the-Air Programing	1	
Misc	*NETPHONE	Phone Number	9133784772	
USB	*STATICIP	Force Static IP	0.0.0.0	
Serial	*DPORT	Device Port	12345	
TCP	*NETUID	Network User ID		
UDP	*NETPW	Network Password		
DNS	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	
Dynamic IP	*HOSTPAP	Request PAP	0	
PPP/Ethernet	S53	Destination Address		
PassThru	S53	Destination Port	0	
SMTp	S53	Default Dial Code	T	
Other				
Low Power				
Friends				
LOGGING				
PINPOINT				
I/O				

Figure 1-3: AceManager : Misc

+++

Note: +++ is not proceeded by AT nor does it require a carriage return (enter). There must be an idle time (set by S50) on the serial port before and after this command.

AT Escape sequence. If the Raven is in a data mode (any mode other than PassThru), this command causes the modem to re-enter AT command mode. The “+” is ASCII 0x2B.+++ is not available in AceManager.

Tip: DAE=1 disables the +++ command.

A/

Note: A/ is not proceeded by AT.

Re-execute last command. A/ is not used in AceManager.

A

Manually answer an incoming connection. A is not used in AceManager.

D[method][d.d.d.d][/ppppp] or D[method][@name][/ppppp]

Dial a connection to a remote IP and Port using method.
Cannot be configured in AceManager.

- **method=P** : Establish a UDP connection
- **method=T** : Establish a TCP connection
- **method=N** : Establish a Telnet connection
- **d.d.d.d**= IP address to contact
- **ppppp**= port to contact

Examples:

ATD - Dial (establish) default connection.

ATDP192.168.13.31/2332 - Dial (establish) UDP session to 192.168.13.31, at port 2332.

To end the connection, issue the +++ escape sequence or drop the DTR line (if Ignore DTR S211=0 or &D2). The default connection is set in S53.

If the method, IP address, or port is omitted, the values from S53 are used. If a telnet connection is requested (N) and the port is not supplied, port 23 will be used instead of the value from S53.

If a domain name is specified, the '@' symbol can be used to explicitly indicate the start of the name. For example, if ATDPHONY is issued, this will be interpreted as dial a UDP connection to "HONY". To dial using the default method to host "PHONY", one would issue ATD@PHONY.

Several special dialing numbers exist to make it easy to establish a PPP or SLIP connection with the modem.

ATD#19788 or ATDT#19788 will establish a PPP connection (see \APPP) and ATDT#7547 will establish a SLIP connection (see \ASLIP).

Tip: *The source port of the session is the Device Port (set by S110 or *DPORT).*

DS=n

Allows a PPP connection to be initiated on the host port.

- **n=2** : Initiates the PPP connection.

Cannot be configured in AceManager.

Hn

Hang-Up Command.

- **n=1** : Hang-up

With an AT telnet connection, this command will terminate the host data mode and return the Raven to an AT mode. Cannot be accessed in AceManager.

O

Online (Remote): Causes the Raven to go from Command State to data state. Cannot be configured in AceManager.

OPRG=*n*

Enables/disables over-the-air firmware upgrading of the Raven. When Sierra Wireless releases a new version of ALEOS, you can upgrade your remote modems with OPRG enabled.

- **n=0** : Disables
- **n=1** : Enables

S53=[method][d.d.d.d][/*ppppp*]

Destination IP address, port, and method. These are used as defaults for the D (Dial) AT command.

- **method= P** : UDP
- **method=T** : TCP
- **method=N** : Telnet
- **d.d.d.d**=IP address or domain name
- **ppppp**=the port address

Examples:

ATS53=T192.168.100.23/12345

ATS53=foo.earlink.com

Telnet to the specified IP at port 12345.

ATS53=192.168.100.23/12345

Query the specified IP at port 12345.

ATS53=/12345

Query port 12345.

Z

Reset the Raven. In AceManager, this command is performed with the Reset option on the toolbar.

Tip: **DATZ=1 will disable Z.*

&W

Writes all changed modem settings. If this command is not issued, any modified values will revert back to their previous values at modem reset. Cannot be configured in AceManager.

***DATE=[mm/dd/yyyy],[hh:mm:ss]**

Sets and queries the internal clock. Either the date and time can be specified, or simply one of the two can be specified in which case the unspecified value will remain unchanged. The date and time are always specified 24-hour notation.

- **mm/dd/yyyy=date** in month/day/year notation
- **hh:mm:ss=time** in 24-hour notation

***DPORT=n**

The modem's Device Port which the modem is listening on for inbound packets/data/polls. Can also be set with the command S110.

- **n=1-65535**

***HOSTPAP=n**

Use PAP to request the user login and password during PPP negotiation on the host connection.

- **n=0** : Disable PAP request (Default).
- **n=1** : Takes user login and password from Windows DUN connection and copies to *NETUID and *NETPW.

***NETALLOWZEROIP=n**

Allows the displayed IP address in *NETIP to end in zero (ex. 192.168.1.0).

- **n=0** : Do not allow.
- **n=1** : Allow.

***NETPW=pw**

The password that is used to login to the cellular network, when required.

- **pw=password** (30 characters maximum)

***NETPHONE?**

The modem's phone number, if applicable or obtainable.

-

***NETUID=uid**

The login that is used to login to the cellular network, when required.

- **uid=user id** (up to 64 bytes)

***STATICIP=d.d.d.d**

Set the static IP required to be received from the network. If the modem does not get this IP address from the network, it will reset the internal hardware and try again. The default is 0.0.0.0, which allows any IP address from the network.

- **d.d.d.d=IP address**

Example:

AT*STATICIP=192.168.1.23

Caution: *STATICIP does not set the IP address of the modem, it merely tells the modem which IP address to expect. If the expected IP address is not granted while registering on the cellular network, the modem will try to register on the network again until it receives that IP address. If your account is set up for a dynamic IP address and you set an address for *STATICIP, you may not be able to register on the network at all since there is no guarantee you will receive the same dynamic IP address again.*

***STATUSCHK=n**

Checks if an SMS message has been received by the modem.

- **n=1-255** : Seconds between checks.
- **n=0** : Never check.

Serial

This group includes commands specific to general use of the serial port.

GROUPS	MODEM DATA			PRINTABLE VIEW
----- INFO ----- STATUS ----- COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other Friends ----- LOGGING ----- 1X/EV-DO ----- TELEMETRY ----- ADDR LIST	AT	Name	Value	New Value
	S23	Configure Serial Port	115200,8N1	<input type="text"/>
	\Q	Serial Port Flow Control	2	<input type="text"/>
	S50	Data Forwarding Timeout	1	<input type="text"/>
	S51	Data Forwarding Character	0	<input type="text"/>
	E	DB9 Serial Echo	1	<input type="text"/>
	E	Telnet Echo	0	<input type="text"/>
	V	AT Verbose Mode	1	<input type="text"/>
	&D	DTR Mode	2	<input type="text"/>
	S211	DTR Mode	0	<input type="text"/>
	&S	Assert DSR	0	<input type="text"/>
	&C	Assert DCD	1	<input type="text"/>
	*CTSE	Enable CTS to Indicate Network Coverage	0	<input type="text"/>
	Q	Quiet Mode	0	<input type="text"/>
	X	Call Progress Result Mode	0	<input type="text"/>
	*NUMTOIP	Convert 12 digit Number to IP	0	<input type="text"/>

Figure 1-4: AceManager : Serial

En

Toggle AT command echo mode.

- **n=0** : Echo Off.
- **n=1** : Echo On.

Qn

The AT quiet-mode setting. If quiet mode is set, there will be no responses to AT commands except for data queried.

- **n=0** : Off (Default).
- **n=1** : Quiet-mode on.

S3=n

The standard end of line character used to indicate the end of an AT command. This character is also used as the carriage return character for framing responses and result codes in command state. Cannot be configured in AceManager.

- **n=0-127** (ASCII character number)

S4=n

The standard line feed character sent by the modem to the host at the end of a response or return code in command state. Cannot be configured in AceManager.

- **n=0-127** (ASCII character number)

S5=n

This register sets the character recognized as a backspace during command entry. Cannot be configured in AceManager.

- **n=0-127** (ASCII character number)

S6=n

This register denotes the wait time, in seconds, before a blind dial (no dial tone detection). Cannot be configured in AceManager.

- **n=2-10** seconds

S8=n

Whenever a dial command contains the comma character, the contents of this register specify the pause time for each comma. Cannot be configured in AceManager.

- **n=0-255**

S9=*n*

Specifies the time that the received carrier must be present for the modem to recognize it and turn on Data Carrier Detect (DCD) if applicable. The implementation is entirely at the IWF modem. Cannot be configured in AceManager.

- **n=0-255**

S10=*n*

Specifies the amount of time that the carrier from the remote modem can be lost before the modem goes on-hook. This allows temporary disruptions to carrier without disconnecting. A setting of 255 causes the modem to disable Carrier Detect and presume carrier is always present. Cannot be configured in AceManager.

- **n=1-2545**

S23=[*speed*],[*databits*][*parity*][*stop bits*]

Serial line parameters. The settings take affect after reset.

- **speed**=300 | 1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200 | 230400
- **databits**=7 or 8 (Databits MUST be 8 data bits for PPP mode.)
- **parity**=O : Odd
- **parity**=E : Even
- **parity**=N : None
- **parity**=M : Mark
- **stopbits**=1 | 1.5 | 2

Example:

ATS23=19200,8N1

Sets modem to 19200, 8 databits, no parity, and 1 stop bit.

Tip: *Can also be set using &L=[*speed*],[*databits*] [*parity*][*stop bits*]*

S50=*n*

Data forwarding idle time-out. If set to 0, a forwarding time-out of 10ms is used. Used in UDP or TCP PAD mode.

- **n=tenths of a second**

S51=*n*

PAD data forwarding character. ASCII code of character that will cause data to be forwarded. Used in UDP or TCP PAD mode.

- **n=0** : No forwarding character.

S211=n

For applications or situations where hardware control of the DTR signal is not possible, the modem can be configured to ignore DTR. When Ignore DTR is enabled, the modem operates as if the DTR signal is always asserted.

- **n=0** : Use hardware DTR. (default).
- **n=1** : Ignore DTR.
- **n=3** : Ignore DTR and assert DSR. This value is deprecated, and it is recommended to use &S to control the DSR instead. When this value is set to 3, &S will automatically be set to 0. See also: &D and &S.

Vn

Command Response Mode.

- **n=0** : Terse (numeric) command responses
- **n=1** : Verbose command responses (Default).

Xn

Extended Call Progress Result mode.

- **n=0** : Turn off extended result codes (Default).
- **n=1** : Turn on result codes. This adds the text 19200 to the CONNECT response.

&Cn

Set DCD mode.

- **n=0** : Always assert DCD.
- **n=1** : Assert DCD when in a data mode (UDP, TCP, PPP, or SLIP) (Default).
- **n=2** : Assert DCD when the modem has network coverage.

&Dn

Set DTR mode.

- **n=0** : Ignore DTR, same effect as HW DTR always asserted (same as S211=1).
- **n=2** : Use hardware DTR (same as S211=0).

&Sn

Set DSR mode.

- **n=0** : Always assert DSR (Default).
- **n=1** : Assert DSR when in a data mode (UDP, TCP, PPP, or SLIP) (Default).

- **n=2** : Assert DSR when the modem has network coverage.

Tip: S211 can also be used to request that DSR is always asserted. If S211 is set to 3 and &S is changed to a non-zero value, S211 will be changed to 1.

\APPP

Set modem operation to PPP mode. Cannot be configured in AceManager.

Set modem operation to SLIP mode. DTR must be asserted (&D0 or S211=1). Cannot be configured in AceManager.

\Qn

Set or query the serial port flow control setting.

- **n=0** : No flow control is being used.
- **n=1** : RTS/CTS hardware flow control is being used.
- **n=4** : Transparent software flow control. Uses escaped XON and XOFF for flow control. XON and XOFF characters in data stream are escaped with the @ character (0x40). @ in data is sent as @@.

+FCLASS=n

This command sets the Raven into a particular fax-mode operation, which causes the internal hardware to process information presented in the Dial command in a manner suitable for that type of information. Cannot be configured in AceManager.

- **n=0** : Fax/data call.
- **n=8** : Normal interconnect.

+WVCLASS? queries the current setting.

+WVCLASS=n

This command sets the Raven into a particular voice-mode operation, which causes the internal hardware to process information presented in the Dial command in a manner suitable for that type of information. Cannot be configured in AceManager.

- **n=0** : Normal interconnect (using line 1).
- **n=9** : Fax/data call.

***CTSE=n**

Clear To Send Enable: This feature asserts CTS when there is a network connection.

- **n=0** : Disabled (Default).
- **n=1** : Enable assertion of CTS when there is network coverage.

RS232 voltage levels:

Positive = Network coverage.

Negative = No coverage.

Tip: Flow control (AT\Q) will override this indication, so if you want to use CTS to indicate network coverage, flow control has to be off (AT\Q0).

*MODEMHISPEED

Set the internal serial link speed to the internal (radio) module.

- **n=0** : 38400 (default)
- **n=1** : 115200

*NUMTOIP=n

Convert 12 digit number to IP.

- **n=0** : Use as name.
- **n=1** : Use as IP address.

*PPPNOCARRIER=n

Provides a “No Carrier” message to a device connected to the serial port using PPP or CHAP when the cellular connection becomes unavailable.

- **n=0** : Disabled (Default).
- **n=1** : Enabled.

TCP

This group includes commands specific to TCP serial communications.

GROUPS		MODEM DATA		PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	S0	TCP Auto Answer	0	<input type="text"/>
COMMON	S7	TCP Connect Timeout	30	<input type="text"/>
Misc	TCPT	TCP Idle Timeout	0	<input type="text"/>
Serial	TCPS	TCP Idle Timeout Secs	0	<input type="text"/>
ICP	S221	TCP Connect Response Delay	0	<input type="text"/>
UDP	S60	Telnet Echo Mode	1	<input type="text"/>
DNS	*ENQ	Enable ENQ on TCP Connect	0	<input type="text"/>
Dynamic IP				
PPP/Ethernet				
PassThru				
SMTP				
Other				
Friends				

Figure 1-5: AceManager : TCP

S0=*n*

This register determines how the Raven responds to an incoming TCP connection request. The Raven remains in AT Command mode until a connection request is received. DTR must be asserted (S211=1 or &D0) and the Raven must be set for a successful TCP connection. The Raven will send a "RING" string to the host. A "CONNECT" sent to the host indicates acknowledgement of the connection request and the TCP session is established.

- **n=0** : Off (Default).
- **n=1** : On.
- **n=2** : Use Telnet server mode on TCP connections.
- **n=3** : With a Telnet connection, overrides the client's default echo, allowing the server on the host port to perform the echo. CRLF sequences from the telnet client will also be edited to simply pass CRs to the server on the host port.

S7=*n*

Specifies the number of seconds to wait for a TCP connection to be established when dialing out.

- **n=seconds**

S60=*n*

Telnet Client Echo Mode.

- **n=0** : No Echo
- **n=1** : Local Echo (Default)
- **n=2** : Remote Echo

S221=*n*

Connect Delay: Number of seconds to delay the "CONNECT" response upon establishing a TCP connection. OR Number of tenths of seconds to delay before outputting ENQ on the serial port after the CONNECT when the ENQ feature is enabled

- **n=0 - 255**

TCPS=*n*

TCP connection time-out (TCPS) units. Specifies a time interval upon which if there is no in or outbound traffic through a TCP connection, the connection will be terminated.

- **n=0** : minutes
- **n=1** : seconds

TCPT=*n*

Interval to terminate a TCP connection when no in or outbound traffic. This value affects only the TCP connection in TCP PAD mode.

- **n=interval**

Caution: *TCPT should never be 0 when using the TCP mode. A broken TCP session can result in the modem being left with a TCP half-open connection that can only be terminated with a reset.*

ENQ=*n

Outputs an ENQ [0x05] after the TCP CONNECT delayed by the Delay Connect Response time (S221).

- **n=0** : Disabled (Default).
- **n=1** : Enable ENQ on CONNECT.

UDP

This group includes commands specific to UDP serial communications.

GROUPS	MODEM DATA	PRINTABLE VIEW
INFO	AT	Name
STATUS	MD	Startup Mode Default DB9 Serial
COMMON	S82	UDP Auto Answer
Misc	S83	UDP Idle Timeout
Serial	HOR	UDP Auto Answer Response
TCP	*UDPLAST	UDP Connect Last
UDP	AIP	Allow Any IP
DNS	*UALL	Allow All UDP
Dynamic IP	*DU	Dial UDP Always
PPP/Ethernet	*USD	UDP Serial Delay
PassThru		
SMTP		
Other		
Friends		
LOGGING		

Figure 1-6: AceManager : UDP

AIP=*n*

Allow IP address.

- **n=0** : Allow only the IP address specified in S53 to connect when UDP auto answer is enabled (S82=2).
- **n=1** : Allow any incoming IP address to connect when UDP auto answer is enabled (S82=2).

Note: Always subject to any Friends filters that may be defined.

HOR=*n*

Half-Open Response - In UDP auto answer (half-open) mode.

- **n=0** : No response codes when UDP session is initiated.
- **n=1** : RING CONNECT response codes sent out serial link before the data from the first UDP packet.

Note: Quiet Mode must be Off.

MD*hh*

Default power-up mode for the serial port: When the Raven modem is power-cycled, the serial port enters the mode specified by this command after 5 seconds. On startup, typing ATMD0 within 5 seconds changes the mode to normal (AT command) mode. See also S53 to set the port for UDP or TCP.

- **hh** (hex byte)=**00** : normal
- **hh=01** : SLIP
- **hh=02** : PPP
- **hh=03** : UDP
- **hh=04** : TCP
- **hh=07** : PassThru
- **hh=0F** : PinPoint MDT
- **hh=13** : Modbus ASCII
- **hh=23** : Modbus RTU (Binary)
- **hh=33** : BSAP
- **hh=63** : Variable Modbus
- **hh=73** : Reliable UDP
- **hh=83** : UDP Multicast

S82=*n*

Enables UDP auto answer (half-open) mode.

- **n=0** : Normal mode
- **n=2** : Enable UDP auto answer mode.

S83=*n*

Set or query UDP auto answer idle time-out. If no data is sent or received before the time-out occurs, the current UDP session will be terminated. While a session is active, packets from other IP addresses will be discarded (unless *UALL is set).

- **n=0** : No idle time-out (Default).
- **n=1 - 255** : Time-out in seconds.

***DU=n**

The dial command always uses UDP, even when using ATDT.

- **n=0** : Dial using the means specified (default).
- **n=1** : Dial UDP always, even when using ATDT.

Note: When this parameter is set you cannot establish a TCP PAD connection.

***UALL=n**

Accepts UDP packets from any IP address when a UDP session is active. If there is no UDP session active, an incoming UDP packet will be treated according to the UDP auto answer and AIP settings.

- **n=0** : No effect (Default).
- **n=1** : Accept UDP data from all IP addresses when in a UDP session.

***UDPLAST=n**

If enabled, sets S53 to the last accepted IP address through UDP auto answer. This can be used in conjunction with MD3 so that when there is no UDP session, new ethernet host data will cause a connection to be restored to the last IP accepted through UDP auto answer.

- **n=0** : Does not change S53 setting. (Default).
- **n=1** : Set S53 to the last accepted IP.

***USD=n**

Waits the specified delay before sending the first UDP packet and the subsequent UDP packets out to the port Ethernet.

- **n=0** : No UDP packet delay (Default).
- **n=1 - 255** : Delay in 100ms units, from 100 ms to 25.5 sec.

DNS

This group includes commands specific to the modem being able to use domain names instead of IP addresses for other configuration options.

*Note: *UDPLAST does not change the S53 setting in NVRAM. If the modem is reset, the original S53 setting will be restored from NVRAM.*

GROUPS		MODEM DATA		PRINTABLE VIEW	
INFO STATUS COMMON Misc Serial TCP UDP DNS Dynamic IP	AT	Name	Value	New Value	
	*DNS1	Modem DNS Server 1	68.28.58.11		
	*DNS2	Modem DNS Server 2	68.28.50.11		
	*DNSUSER	Use Alternate DNS	0.0.0.0	<input type="text"/>	
	*DNSUPDATE	DNS Updates	0	<input type="text"/>	

Figure 1-7: AceManager : DNS

***DNSn=d.d.d.d**

Queries the DNS addresses. Your cellular carrier provides the DNS addresses while your modem is registering on their network.

- **n=1** or **2** : First and second DNS address.
- **d.d.d.d=IP address** of domain server.

***DNSUPDATE=n**

Indicates whether the modem should send DNS updates to the DNS server specified by *DNSUSER. These updates are as per RFC2136. They are not secure and are recommended only for a private network. In a public network, the IP Logger services should be used instead.

- **n=0** : DNS updates disabled (Default).
- **n=1** : DNS updates enabled.

***DNSUSER=d.d.d.d**

Sets a user-provided DNS to query first when performing name resolutions in the modem.

- **d.d.d.d=IP address** of domain server

Dynamic IP

This group includes commands specific to dynamic DNS. Dynamic DNS allows the Raven to use a dynamic IP address account, with an IP address that can change each time you connect, and still allow you to use a fully qualified domain name to contact the Raven using IP Manager running on a server with a dynamic DNS updater.

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	*MODEMNAME	Modem Name	603eea33		
COMMON	*DOMAIN	Domain			
Misc	*IPMANAGER1	IP Manager Server 1 (IP Adrs)			
Serial	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0		
TCP	*IPMGRKEY1	IPMServer1 Key	*****		
UDP	*IPMANAGER2	IP Manager Server 2 (IP Adrs)			
DNS	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0		
Dynamic IP	*IPMGRKEY2	IPMServer2 Key	*****		
PPP/Ethernet					
PassThru					
SMTP					
Other					
Friends					
LOGGING					

Figure 1-8: AceManager : Dynamic IP

***DOMAIN=name**

Domain (or domain zone) of which the Raven is a part. This value is used during name resolutions if a fully qualified name is not provided and also for DNS updates. This value can be up to 20 characters long.

- **name=domain name** (i.e. eairlink.com)

If *DOMAIN=eairlink.com, then when ATDT@remote1 is entered, the fully qualified name remote1.eairlink.com will be used to perform a DNS query to resolve the name to an IP address.

Tip: Only letters, numbers, hyphens, and periods can be used in a domain name.

***IPMANAGERn=[name][IP address]**

Sets a domain name or IP address to send IP change notifications to. Up to two independent IP Manager servers can be set, using either AT*IPMANAGER1 or AT*IPMANAGER2. Updates to a server can be disabled by setting that entry to nothing (for example, "AT*IPMANAGER1=").

- **n=1** : First IP Manager server.
- **n=2** : Second IP Manager server.
- **name=domain name**

***IPMGRKEYn=key**

Sets the 128-bit key to use to authenticate the IP update notifications. If the key's value is all zeros, a default key will be used. If all the bytes in the key are set to FF, then no key will be used (i.e. the IP change notifications will not be authenticated). AT*IPMGRKEY1 is used to set the key to use with AT*IPMANAGER1, while AT*IPMGRKEY2 is used to the key with AT*IPMANAGER2.

- **n=1** : First IP Manager server.

- **n=2** : Second IP Manager server.
- **key=128-bit key** in hexadecimal [32 hex characters]

***IPMGRUPDATE $n=m$**

Sets the number of minutes to periodically send an IP update notification to the corresponding server. This will occur even if the IP address of the Raven doesn't change. *IPMGRUPDATE1 is used to set the refresh rate to *IPMANAGER1, while *IPMGRUPDATE2 is used with *IPMANAGER2. If the value is set to 0, then periodic updates will not be issued (i.e. IP change notifications will only be sent when the IP actually changes).

- **n=1** : First IP Manager server.
- **n=2** : Second IP Manager server.
- **m=0, 5-255** : Number of minutes to send an update.

***MODEMNAME=name**

Name of the Raven (up to 20 characters long) to use when performing IP address change notifications to IP Manager. The value in *DOMAIN provides the domain zone to add to this name.

- **name=modem name** (for example, mymodem)

Example: if *MODEMNAME=mymodem and *DOMAIN=eairlink.com, then the modem's fully qualified domain name is mymodem.eairlink.com.

Automatically Generated Names:

#I3 - The ESN/IMEI will be used as the name.

#CCID - The CCID will be used as the name.

#NETPHONE - The phone number will be used as the name.

Tip: Each modem using IP Manager needs a unique name. Two modems cannot be called "mymodem". One could be "mymodem1" with the other as "mymodem".

PPP/Ethernet

This group includes commands specific to PPP (serial) or Ethernet connections between the Raven and a connected device.

GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*HOSTPRIVMODE	Use Private IP	0	<input type="text"/>
COMMON	*HOSTPRIVIP	Host Private IP	0.0.0.0	<input type="text"/>
Misc	*HOSTPEERIP	Modem Local IP	192.168.13.31	<input type="text"/>
Serial	*HOSTNETMASK	Host network mask	0.0.0.0	<input type="text"/>
TCP	*HOSTAUTH	Host Authentication Mode	0	<input type="text"/>
UDP	*HOSTUID	Host User ID	ZCFzUUeLycb2ug01L+31kw==	<input type="text"/>
DNS	*HOSTPW	Host Password	ZCFzUUeLycb2ug01L+31kw==	<input type="text"/>
Dynamic IP	*DHCPSEVER	DHCP Server Mode	1	<input type="text"/>
PPP/Ethernet				
PassThru				
SMTP				
Other				
Friends				
LOGGING				
1X/EV-DO				
TELEMETRY				
ADDR LIST				

Figure 1-9: AceManager : PPP/Ethernet

DHCPSEVER=*n

- Act as a DHCP server for any Ethernet device connecting to the Raven. DHCP (Dynamic Host Configuration Protocol) allows one device, the DHCP server, to provide dynamic IP addresses to any other device which requests them.
- n=1** : Enabled. The modem will act as the primary DHCP server for the network.
- n=2** : Enabled if no other DHCP server is detected (default). If another DHCP server is detected on the network, the Raven will not send out replies to DHCP requests.**n=0** : Disabled. The Raven X will not send out replies to DHCP requests.

HOSTAUTH=*n

Host Authentication Mode: Use PAP or CHAP to request the user login and password during PPP or CHAP negotiation on the host connection. The username and password set in *HOSTUID and *HOSTPW will be used.

- n=0** : Disable PAP or CHAP request (Default).
- n=1** : PAP and CHAP.
- n=2** : CHAP

HOSTNETMASK=*n.n.n.n

Subnet mask for the host interface. Allows communication with a subnet behind the host interface.

- n.n.n.n = subnet mask**, example 255.255.255.0.

***HOSTPEERIP=d.d.d.d**

Set or query the IP address that can be used to directly contact the Raven once a cellular connection is established. If this value is not specified, 192.168.13.31 will be used.

- **d.d.d.d=local or peer IP address** of the modem.

Note: This is not normally used nor needed by user applications.

***HOSTPRIVIP=d.d.d.d**

Set or query the private IP address that is to be negotiated by the 1x connection if *HOSTPRIVMODE =1.

- **d.d.d.d=IP Address**

***HOSTPRIVMODE=n**

Set or query whether a private or public (network) IP is to be used when the Host initiates a 1x connection to the modem.

- **n=0** : Public (network) IP Mode: When the Host initiates a PPP connection, the host will be given the network IP address that was obtained from the cellular carrier while registering on the network. If the network issues a new IP address, the cellular connection will be closed (since the IP address has changed) and has to be re-initiated. (default).
- **n=1** : Private IP Mode: When the Host initiates a 1x connection, the host will be given the IP address specified in *HOSTPRIVIP. The modem will then perform 1 to 1 NAT-like address translation, which shields the Host from network IP changes.

***HOSTPW=string**

Host Password for PAP or CHAP.

- **string=password**

***HOSTUID=string**

Host User ID for PAP or CHAP.

- **string=user id** (up to 64 bytes)

***IDENTCPFWD=ppppp[,ppppp][,ppppp][,ppppp][,ppppp][,ppppp][,ppppp][,ppppp][,ppppp]**

Port Forwarding of custom TCP ports. Up to 10 (comma separated) ports can be configured.

- **ppppp=port** to be forwarded

Tip: The modem should be reset upon configuring these so that the new values will be applied. The AT*DPORT value can also be used to specify one port (both UDP and TCP) to be forwarded.

***IDENUDPFWD=ppppp[,ppppp][,ppppp][,ppppp][,ppppp][,ppppp][,ppppp] [,ppppp][,ppppp][,ppppp][,ppppp]**

Port Forwarding of custom UDP ports. Up to 10 (comma separated) ports can be configured.

- **ppppp=port** to be forwarded

Tip: The modem should be reset upon configuring these so that the new values will be applied. The AT*DPORT value can also be used to specify one port, both UDP and TCP, to be forwarded.

***NETMINAUTH=n**

Minimum Server Authentication Mode.

- **n=0** : Accept All Authentication.
- **n=1** : CHAP Authentication.
- **n=2** : Reject Authentication.

PassThru

PassThru Mode is used to communicate directly to the Raven internal hardware.

Caution: While the modem is in PassThru mode, ALEOS is disabled. If you need to connect to the Raven while it is in PassThru mode, you will need to do so with a terminal application. Not all commands are available while the modem is in PassThru mode.

GROUPS	MODEM DATA		PRINTABLE VIEW	
INFO STATUS COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet <u>PassThru</u> SMTP	AT	Name	Value New Value	
	*PTINIT	Passthrough Init String	<input type="text"/>	<input type="text"/>
	*PTREFRESH	Passthrough Init Refresh (Minutes)	0	<input type="text"/>
	*RESETPERIOD	Modem Reset Period (Hours)	0	<input type="text"/>
	*CSX1	Passthrough Echo	0	<input type="text"/>

Figure 1-10: AceManager : PassThru

Note: This mode is not available through the remote AT telnet server. You will need to connect to the Raven with it connected directly to your computer.

\APASSTHRU

Sets the modem operation to pass through mode. This mode will pass any characters received on the port Ethernet directly to the internal hardware module and output any characters from the internal hardware module out the port Ethernet. This allows direct access/configuration of the hardware module. Once this mode is entered, the unit must be physically reset to return to normal operation. This command is not available in AceManager.

Note: It may take up to 30 seconds for the hardware module to respond after CONNECT is output.

CSX1=*n

PassThru Echo : Echo data to the host.

- **n=0** : Data will be passed to the host.
- **n=1** : PASSTHRU mode will echo all host received data and will not pass the data to the modem while the modem is not asserting DCD.

*Note: If the modem is asserting DCD, data will be passed from the host to the modem as it normally is when *CSX1=0.*

PTINIT=*string

Any AT Command string to be passed to the OEM module before entering PASSTHRU mode, e.g. AT&S1V1, etc.

- **string=AT command(s)**

PTREFRESH=*n

Number of minutes of inactivity in PASSTHRU mode to resend the *PTINIT string to the hardware module.

- **n=0** : Disabled
- **n=1-255** minutes

RESETPERIOD=*n

In PASSTHRU mode, modem will be reset after this period if no data has been sent or received. Value is in hours.

- **n=0** : Disabled
- **n=1-255** hours

SMTP

SMTP (Simple Mail Transfer Protocol) is the de facto standard for email transmission across the Internet. The Raven can send messages using SMTP if it has been configured to use a mail server.

Note: You cannot send an Email with your Raven unless the Email server you have configured allows your Raven as a relay host. Talk to your network administrator to ensure you can send email through the email server using your Raven.

SMS (Short Message Service) is another way to send messages via the cellular network. Most SMS commands require the modem to be in PassThru mode.

Note: SMS may not be supported by your account with your cellular carrier.

GROUPS	MODEM DATA			PRINTABLE VIEW
----- INFO ----- STATUS ----- COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other	AT	Name	Value	New Value
	*SMTPADDR	SMTP Server IP Address	<input type="text"/>	<input type="text"/>
	*SMTPFROM	From email address	<input type="text"/>	<input type="text"/>
	*SMTPUSER	User Name (optional)	<input type="text"/>	<input type="text"/>
	*SMTPPW	Password (optional)	*****	<input type="text"/>
	*SMTPSUBJ	SMTP Message Subject	<input type="text"/>	<input type="text"/>

Figure 1-11: AceManager : SMTP

NETSMS2EMAIL=*n

Specify the SMS/E-mail server number. This maybe necessary to send an SMS message to an email address. Cannot be used with AceManager.

- **n=SMS/E-mail server number**

***SMTPADDR=[*d.d.d.d*][*name*]**

Specify the IP address or Fully Qualified Domain Name (FQDN) of the SMTP server to use.

- **d.d.d.d=IP Address**
- **name=domain name** (maximum: 40 characters).

SMTPFROM=*email

Sets the email address from which the SMTP message is being sent.

- **email=email address** (maximum: 30 characters).

***SMTPPW=pw**

Sets the password to use when authenticating the email account (*SMTPFROM) with the server (*SMTPADDR).

- **pw= password**

Note: Not required to use SMTP settings but may be required by your cellular carrier.

***SMTPSEND=email[body]**

Sends an email to the address specified, followed by the body of the email message. The email message is terminated and sent by entering a . or Ctrl-Z on an empty line. Cannot be configured with AceManager.

- **email=email address**
- **body=message body**

***SMTPSTATUS?**

Returns the status of the last issued SMTP message (*SMTPSEND). If no status is available 0 is returned. Once read, the status is cleared out. The status codes returned come from the SMTP server to which that the modem sent the request. Unless the receiving server is not standard, they follow the RFC for SMTP. Cannot be used with AceManager.

Example:

354 = send in progress
250 = sent ok

***SMTPSUBJ=subject**

Allows configuration of the default Subject to use if one isn't specified in the message by providing a "Subject: xxx" line as the initial message line.

- **subject=message subject**

***SMTPUSER=user**

The email account username to authenticate with the SMTP server (*SMTPADDR) for sending email.

- **user=username** (maximum: 40 characters).

Note: Not required to use SMTP settings but may be required by your cellular carrier.

Remarque :

Other

GROUPS

MODEM DATA

PRINTABLE VIEW

INFO

STATUS

COMMON

Misc

USB

Serial

TCP

UDP

DNS

Dynamic IP

PPP/Ethernet

PassThru

SMTP

Other

Low Power

Friends

LOGGING

AT	Name	Value	New Value
*IPING	Keepalive Ping Time	0	
*IPINGADDR	Keepalive Ping Address		
*MSCIUPDADDR	Status Update Address	/0	
*MSCIUPDPERIOD	Status Update Period (Seconds)	0	
*TPORT	AT Telnet Port	2332	
*TELNETTIMEOUT	AT Telnet Port Timeout (Minutes)	2	
DAE	Disable AT Escape	0	
*DATZ	Disable ATZ Reset	0	
*SNTP	Enable time update	0	
*SNTPADDR	SNTP Server Address		
*NETWDOG	Network Connection Wait	20	
*SNMPPORT	SNMP Port	0	
*SNMPSECLVL	SNMP Security Level	0	
*SNMPTRAPDEST	SNMP Trap Destination IP	/0	
*SNMPCOMMUNITY	SNMP Community String	public	

Figure 1-12: AceManager : Other

DAE=*n*

AT Escape Sequence detection.

- **n=0** : Enable
- **n=1** : Disable

*DATZ=*n*

Enables or disables reset on ATZ.

- **n=0** : Normal Reset (Default).
- **n=1** : Disable Reset on ATZ.

*IPING=*n*

Set the period to ping (if no valid packets have been received) a specified address (*IPINGADDR) to keep the modem alive (online).

- **n=0** : Disable ping (default)
- **n=15-255** minutes

*Note: 15 minutes is the minimum interval which can be set for Keepalive. If you set *IPING for a value between 0 and 15, the minimum value of 15 will be set.*

***IPINGADDR=[d.d.d.d][name]**

Set the IP address or valid internet domain name for the Raven to ping to keep itself alive (online). *IPING must be set to a value other than 0 to enable pinging.

- **d.d.d.d=IP address**
- **name=domain name**

***MSCIUPDADDR=name[/port]**

Modem Status Update Address - where Name/Port is the domain name and port of the machine where the modem status updates will be sent. The status parameters of the Raven are sent in an XML format.

- **name=domain name**
- **port=port**

***MSCIUPDPERIOD=n**

Modem Status Update Period - where n defines the update period in seconds.

- **n=0** : Disabled.
- **n=1-255** seconds

***NETWDOG=n**

Network connection watchdog: The number of minutes to wait for a network connection. If no connection is established within the set number of minutes, the Raven modem resets.

- **n=0** : Disabled.
- **n=minutes** : Default = 120 min.

***RESETCFG**

Wipe the non-volatile data in the modem. Cannot be used with AceManager.

Caution: *You may need to reactivate your modem if you erase the non-volatile data.*

***SNMPCOMMUNITY=string**

The SNMP Community String acts like a password to limit access to the modem's SNMP data.

- **string=string** of no more than 20 characters (default = public).

***SNMPPORT=n**

This controls which port the SNMP Agent listens on.

- **n=0** : SNMP is disabled.
- **n=1-65535**

SNMPSECLVL=*n

Selects the security level requirements for SNMP communications.

- **n=0** : No security required. SNMPv2c and SNMPv3 communications are allowed.
- **n=1** : Authentication equivalent to “authNoPriv” setting in SNMPv3. SNMPv3 is required to do authentication, SNMPv2c transmissions will be silently discarded.
- **n=2** : Authentication and encryption, equivalent to “authPriv” setting in SNMPv3. SNMPv3 is required to do authentication and encryption, SNMPv2c and SNMPv3 authNoPriv transmissions will be silently discarded. Messages are both authenticated and encrypted to prevent a hacker from viewing its contents.

***SNMPTRAPDEST=host/[port]**

Controls destination for SNMP Trap messages. If port is 0 or host is empty, traps are disabled. Traps are sent out according to the SNMP security level (i.e. if the security level is 2, traps will be authenticated and encrypted). Currently, the only trap that can be generated is linkup.

- **host=IP address**
- **port=TCP port**

SNTP=*n

Enables daily SNTP update of the system time.

- **n=0** : Off
- **n=1** : On

***SNTPADDR=[*d.d.d.d*][*name*]**

SNTP Server IP address, or fully-qualified domain name, to use if *SNTP=1. If blank, time.nist.gov is used.

- **d.d.d.d=IP address**
- **name=domain name**

TELNETTIMEOUT=*n

Telnet port inactivity time out. By default, this value is set to close the AT telnet connection if no data is received for 2 minutes.

- **n=minutes**

TPORT=*n

Sets or queries the port used for the AT Telnet server. If 0 is specified, the AT Telnet server will be disabled. The default value is 2332.

- **n=0** : Disabled.
- **n=1-65535**

Tip: Many networks have the ports below 1024 blocked. It is recommended to use a higher numbered port.

***TQUIT**

Disconnects the telnet session. Not available in AceManager..

Friends

Friends Mode can limit access to the Raven from the cellular network and the Internet. Friends mode is a basic firewall.

Caution: If you are using Friends Mode you will not be able to use AceManager remotely or Telnet to the modem unless you are contacting the modem from one of the configured IP addresses.

Note: Friends Mode will only prevent the Raven modem from receiving data from those IP addresses not on the Friends List. It cannot prevent data, such as pings, from traversing the network to the modem which may billable traffic even though the modem does not receive the data.

GROUPS		MODEM DATA		PRINTABLE VIEW	
INFO		AT	Name	Value	New Value
STATUS		FM	Friends Mode	0	<input type="text"/>
COMMON		F0	Friends List IP0	0.0.0.0	<input type="text"/>
Misc		F1	Friends List IP1	0.0.0.0	<input type="text"/>
Serial		F2	Friends List IP2	0.0.0.0	<input type="text"/>
TCP		F3	Friends List IP3	0.0.0.0	<input type="text"/>
UDP		F4	Friends List IP4	0.0.0.0	<input type="text"/>
DNS		F5	Friends List IP5	0.0.0.0	<input type="text"/>
Dynamic IP		F6	Friends List IP6	0.0.0.0	<input type="text"/>
PPP/Ethernet		F7	Friends List IP7	0.0.0.0	<input type="text"/>
PassThru		F8	Friends List IP8	0.0.0.0	<input type="text"/>
SMTP		F9	Friends List IP9	0.0.0.0	<input type="text"/>
Other					
Friends					
LOGGING					
1X/EV-DO					
TELEMETRY					
ADDR LIST					

Figure 1-13: AceManager : Friends

FM=*n*

Friends Mode - Only allow specified IPs to access the Raven modem.

- **n=0** : Disable Friends mode
- **n=1** : Enable Friends mode - Only packets from friends will be accepted, packets from other IP addresses are ignored.

Fn=[*d.d.d.d*]

Friends mode IP address.

- **n=0-9** Friends list index
- **d.d.d.d** = IP address

Using 255 in the IP address will allow any number.

Example: 166.129.2.255 allows access by all IPs in the range 166.129.2.0-166.129.2.255.

Tip: *ATF?* will return a list of all the current Fn settings.

Logging

This group includes commands specific to the internal log.

Caution: *Logging is intended for diagnostic purposes only. Extensive use of logging features can cause degraded modem performance.*

GROUPS	MODEM DATA				PRINTABLE VIEW
INFO STATUS COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other Friends LOGGING	AT	Name	Value	New Value	
	*DBGPPPLVL	PPP Logging Detail	1	<input type="text"/>	
	*DBGIPLVL	IP Logging Detail	0	<input type="text"/>	
	*DBGCOMLVL	COM Port Logging Detail	0	<input type="text"/>	
	*DBGETHLVL	Ethernet Logging Detail	0	<input type="text"/>	
	*DBGDHCPLVL	DHCP Logging Detail	0	<input type="text"/>	

Figure 1-14: AceManager : Logging

DBGCOMMLVL=*n

Set the logging level for the host or module COM port.

- **n=0** : No logging
- **n=1** : Host COM Port
- **n=2** : Module COM Port

DBGIPLVL=*n

Sets the logging level for the IP subsystem.

- **n=0** : No logging
- **n=1** : Log errors (i.e. invalid/corrupt packets, etc.).
- **n=2** : Log the header of all received packets. Note that this can quickly exhaust available space for the event log.
- **n=3** : Log the header of all received and sent packets. Note that this can quickly exhaust available space for the event log.

DBGPPPLVL=*n

Sets the logging level for the PPP stack.

- **n=0** : No logging
- **n=1** : Log client events (default)
- **n=2** : Log server events
- **n=3** : Log client and Server events

Telemetry/Addr List

Modbus, commonly used with telemetry devices, allows a connection via serial port to the modem. Telemetry and Addr List commands are only used when the modem is in one of the Modbus start-up modes. Further, Telemetry and the Addr List are available with all Raven line modems which have a serial port, such as the Raven X and the Raven XT.

GROUPS	MODEM DATA				PRINTABLE VIEW
----- INFO ----- STATUS ----- COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other Friends ----- LOGGING ----- TELEMETRY ----- ADDR LIST	AT	Name	Value	New Value	
	RKEY	Radio Keying Enabled	0	<input type="text"/>	
	MVTYP	Modbus Variable Type	0	<input type="text"/>	
	MVOFF	Modbus Variable Offset	0	<input type="text"/>	
	MVLEN	Modbus Variable Length	0	<input type="text"/>	
	MVMSK	Modbus VMask (hex)	00	<input type="text"/>	
	IPL	IP List Dial	0	<input type="text"/>	

Figure 1-15: AceManager : Telemetry

IPL=*n*

IP List Dial allows access the Modbus IP list using the first two digits of the dial string.

Example: ATDT1234567 would go to ID “12” on the Modbus list and use the associated IP as the destination.

- **n=0** : Disabled
- **n=1** : Enabled

MVLEN=n

Modbus Variant ID Length: Length of the RTU ID in a modbus-variant protocol, in bytes.

- **n=1** : This parameter is used to define the length of the RTU ID in Modbus-like protocol data packets.
- **n=2** : This parameter is used when the when the MD is set to hex 63.

MVMSK=hh

Modbus Variant ID Mask: Byte hex mask to use when extracting the ID. Specify which bits in the ID field to use. This parameter is used when the when the Mode Default (MD) is set to hex 63.

- **hh=hex value**
 - **00** - no mask, all 8 bits (default)
 - **0F** - only the low order 4 bits

MVOFF=n

Modbus (variable mode) Offset: Indicates the offset in the data of where the Modbus ID starts.

- **n=0 - 255**

MVOPT=n

Modbus Variant Option: Sets various behavioral options when dealing with a Modbus-variant protocol. This parameter is used when the when MD is set to hex 63. *Cannot be configured in AceManager.*

- **n=0** : No special action (Default).
- **n=1** : Skip leading zeroes in Modbus packets.

MVTYP=n

Modbus Variant Type: The data-type of the RTU ID in a modbus-variant protocol. This parameter is used to define the data-type of the RTU ID in Modbus-like protocol data packets. This parameter is used when MD is set to 63.

- **n=0** : Binary (Default)
- **n=1** : ASCII Hex
- **n=2** : ASCII Decimal

RKEY=*n*

Enable/disable MDS Radio transceiver keying. Radio keying is designed to assert CTS when a packet is received, delay the time as specified, send the data out the serial port, wait the same amount time, drop CTS. This way, the CTS signal can be used to key a transmitter on and give it time to reach its power level before data is sent to it. Delay interval is specified in S221.

- **n=0** : Off (Default).
- **n=1** : On.

Addr List

AT	Name	Value	New Value
Decimal[0xHex]=...	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	
	Address Entry	0=	

Figure 1-16: AceManager : Addr List

MLIST and MLISTX are configured by the fields available in the Addr List group. AceManager automatically differentiates between them to enter the correct command for the modem.

MLISTid=*d.d.d.d*

Enters an ID and IP address into the Modbus List. ID is a decimal value (1 to 100).

- **id=ID**
- **d.d.d.d=IP address or name**

MLISTXhexid=*d.d.d.d*

Enters an ID and IP address into the Modbus List. ID is a hexadecimal value (0 to 64).

- **hexid=ID**
- **d.d.d.d=IP address or name**



B: Circuit Switch Communications

B

- Step by Step Configuration
- Step by Step Configuration

Note: When the Raven is used for circuit switch, the circuit switch configuration will disable all ALEOS features except for serial port communication.

Circuit-switch communication requires the Raven to be in PassThru mode, communicating directly with the internal hardware.

PassThru mode disables the use of ALEOS in the modem. Any features available using ALEOS are not usable when the modem is in PassThru mode. In PassThru mode, the settings available are those of the internal hardware. The Raven N3213 in PassThru mode can not.

The best machines for use in circuit-switched mode are ones that can provide their own INIT or setup strings and/or issue AT commands. For customers who have unintelligent machines who still need to have the modem 'ready' to behave in a certain way (such as Auto-Answering circuit-switched data calls), there is a feature in the modem called the INIT STATE.

For iDEN, circuit-switched configuration requires an account/SIM specifically configured for a Circuit-Switched Data (CSD) plan with no restriction on inbound or outgoing calls. A SIM/account provisioned only for standard data options will not work for CSD.

Configuring Circuit-Switch

The Raven needs to be configured to enter into PassThru after start up. You can use AceManager (preferred) or direct serial communication to configure the Raven to work in PassThru mode and for circuit-switched communications. In the *UDP* group, select the *MD* command and choose *07-PassThru*.

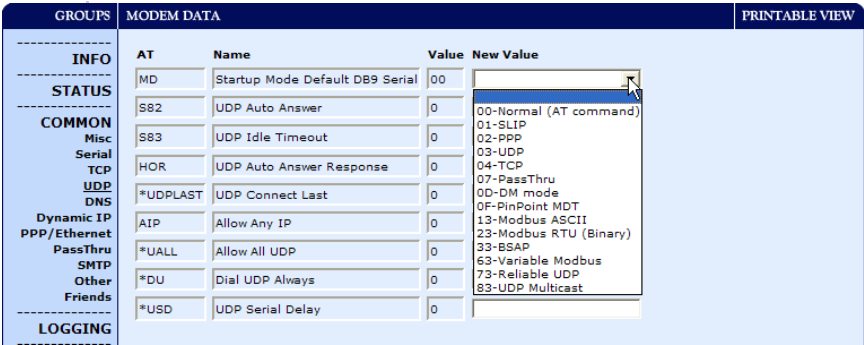


Figure 2-1: AceManager : UDP > MD

The Raven needs a command string sent to the modem after it is initialized. The command string will need to be tailored for your application. Different models of the Raven may respond differently to some of the commands. In the *PassThru* group, type your command string in the input field for **PTINIT*.

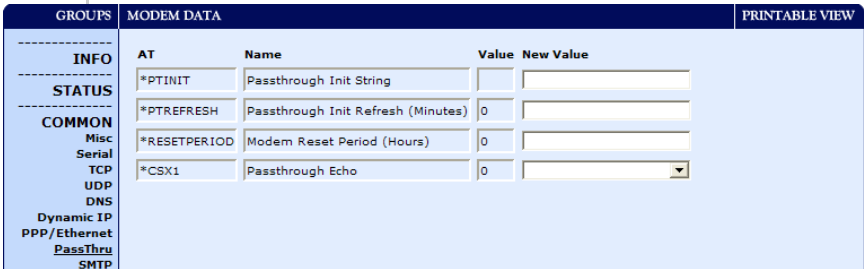


Figure 2-2: AceManager: PassThru

AT Commands and the Command String

Each modem requires a command string that is a combination of AT commands limited to a maximum of 40 characters. The command string will vary depending on the needs of the connected device. For example, some devices need DTR to be high while others need DTR to be ignored. For a full listing as well as parameters and defaults, refer the AT Command appendix.

Caution: The only commands that can be used in the string are those which do not require ALEOS. All AT Commands beginning with an * (asterix) require ALEOS.

AT commands can be concatenated to create a string.

Table 2-1: Example for the Raven C3211

Command	Components
AT*PTINIT=ATS0=1;+WS46=23;+WS45=0;+WVCLASS=9	AT*PTINIT= Include this portion only if you will not be entering the command using a AceManager. The remainder of the example is the command string.
	AT All AT commands must start with "AT".
	S0=1;+WS46=23;+WS45=0;+WVCLASS=9 The string is a combination of AT Commands limited to a maximum of 40 characters.

Common AT Commands

- E - Echo
- Q - Quiet Mode
- &C - DCD Control
- &D - DTR Options
- &S - DSR Options
- S0 - Auto-answer mode
- S7 - Wait for Carrier
- S8 Comma Pause Time
- S9 - Carrier Detect Response Time

Raven LEDs in Circuit-Switched Mode

When the Raven is in Circuit-Switched mode, the LEDs on the front will behave differently. The *Chan*, *Link*, and *Reg* LEDs will flash in tandem, like with PassThru mode, while all other LEDs (except for Power) will be off.

Step by Step Configuration

For your convenience, these directions use a pre-configured template.

1. Gather the required hardware and software

Hardware Required

- A personal computer with a functioning serial port or USB port and a USB to serial converter configured to work with your computer.
- A straight through RS232 cable (DB9M-DB9F).
- A suitable power supply and antenna for the Raven. Without suitable signal strength the modem will not function. Better than at least -100dBm is required.
- An iDEN SIM specifically provisioned for Circuit-Switched data and has no restrictions on incoming/outgoing calls.

Software Required

- **Modem Doctor** - Utility to conduct diagnostics and to bring your modem to a base-level of configuration. You can download Modem Doctor from the Sierra Wireless AirLink Solutions website: <http://www.airlink.com>. This utility does not need to be installed; it is run directly. Remember where you downloaded it to, so you can run it as part of the instructions below.
- **AceManager** - Graphical interface for entering most AT Commands. You can download AceManager from the Sierra Wireless AirLink Solutions website: <http://www.airlink.com/>. A default installation of this utility is assumed later in these directions.
- **Raven Templates for Circuit-Switch** - These templates are provided by your Sierra Wireless AirLink Solutions representative and have a .xml extension. You can also download the appropriate template from: <http://www.airlink.com/docs/AppNotes/CircuitSwitchTemplates/>. You should only download the template which matches your modem model and/or configuration needs.

2. Connect the modem to your computer

Using the RS232 cable, connect the modem to the computer and apply power to the modem.

3. Erase the internal memory

The Raven should have the internal memory erased to bring the modem to a known starting point without any configuration or account programming.

- a. Start Modem Doctor.
- b. Select Erase the modem's non-volatile data.

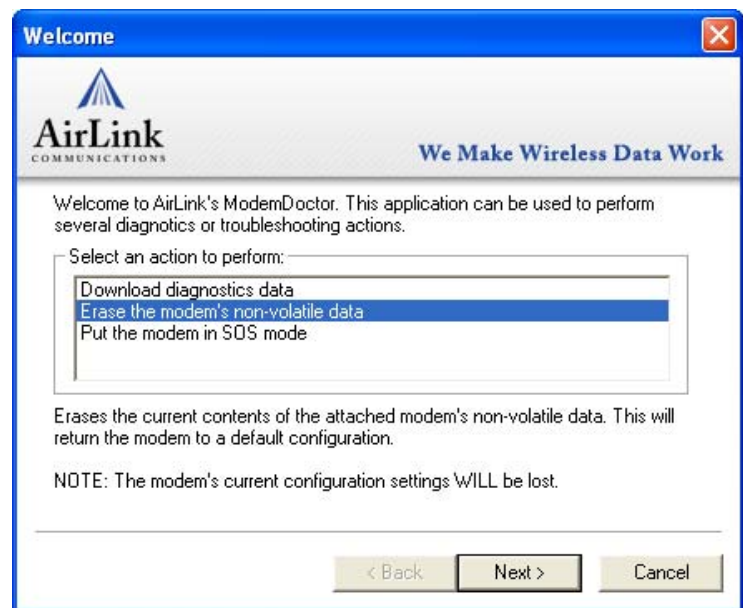


Figure 2-3: Modem Doctor

- c. Select Serial from the Interface options and select the Port on your computer to which the Raven is connected. Leave the Baud setting at 115200.



Figure 2-4: Modem Doctor: Interface

- d. Click the Next button and press the modem Reset button when prompted. The modem Reset button is located on the front panel of the modem and can be accessed with the point of a pen or similar tool.



Figure 2-5: Raven: Reset button

- e. Click the *Exit* button in Modem Doctor when the process is complete.

4. Activate the Raven

Insert the SIM in the Raven iDEN modem.

- a. Refer to the Raven iDEN Quick Start guide (available on the AirLink website: <http://www.airlink.com>) or the Activation chapter in this guide (page 4), for instructions on how to install the SIM in your modem.
- b. The modem should come up and register on the iDEN network in packet-switched mode as indicated by the illumination of the Reg LED on the front of the modem.

5. Start AceManager.

Start > All Programs > AirLink Communications > AceManager 3G > AceManager 3G

- a. Click the Connect button.

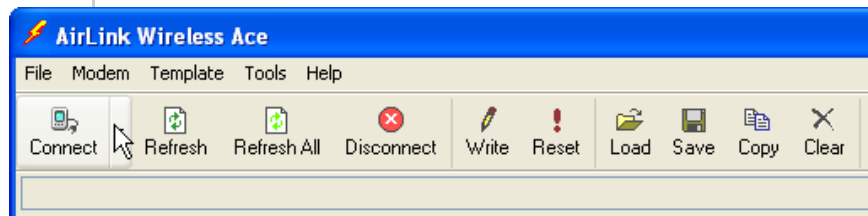


Figure 2-6: AceManager

- b. Select PPP.
- c. Select COM1 for the Port.
- d. Enter 12345 for the Password.
- e. Click OK.

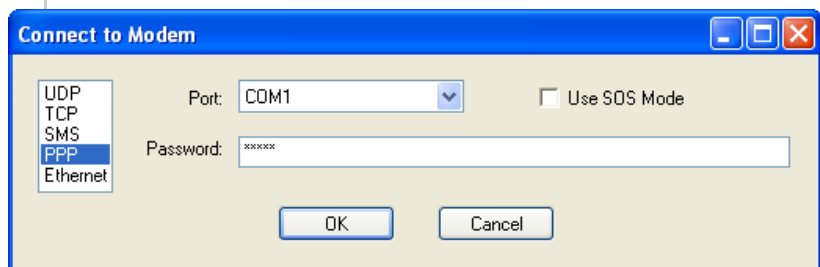


Figure 2-7: AceManager : Connect to Modem using PPP

6. Configure serial port speed.

- a. On the left, under the GROUPS heading, select *Serial*.

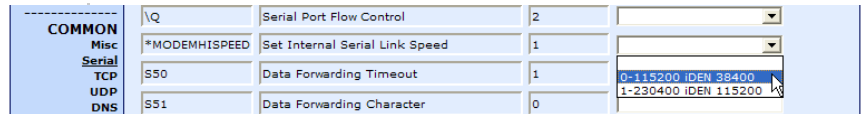


Figure 2-8: AceManager : Serial - *MODEMHISPEED

- b.** Change the *MODEMHISPEED setting to "0".

7. Save the serial setting.

- a.** Click the *Write* button on the tool bar of AceManager and wait for the message "Write Successful" to appear in the status bar.

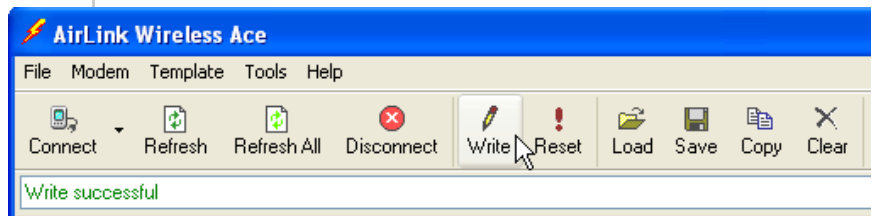


Figure 2-9: AceManager : Write

- b.** Click the *Clear* button.

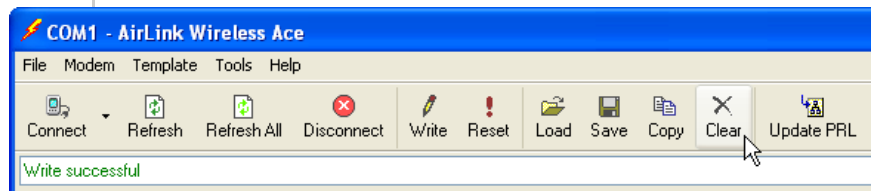


Figure 2-10: AceManager : Clear

- c.** Click the *Disconnect* button.

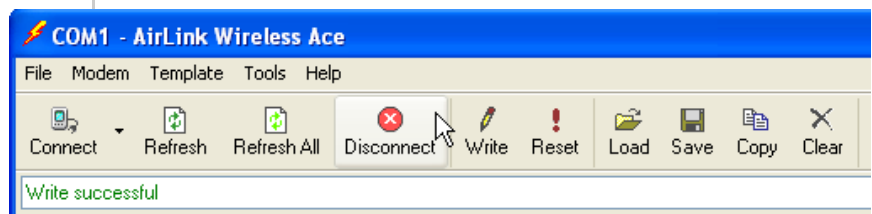


Figure 2-11: AceManager : Disconnect

- d.** Press the modem *Reset* button on the front of the modem.



Figure 2-12: Raven: Reset

- e. Wait until the modem REG indicator is lit and then proceed to the next step.

8. Configure the Raven using a AceManager template.

Caution: Do not proceed to this step before the REG indicator light is lit.

- a. Click the *Refresh All* button on the tool bar of AceManager and wait until all of the modem information is loaded into the AceManager application.

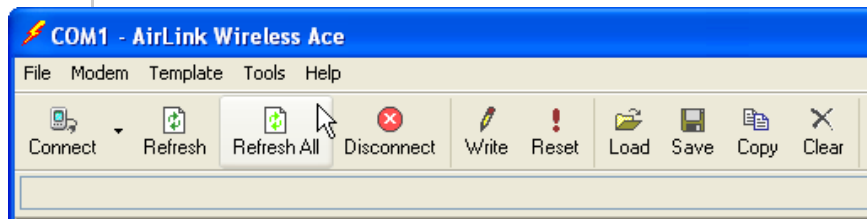


Figure 2-13: AceManager : Refresh All

- b. Click the *Load* button on the tool bar.

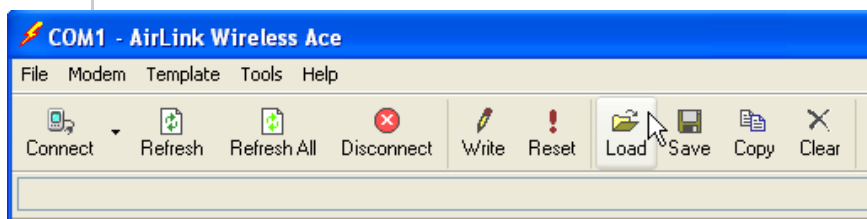


Figure 2-14: AceManager : Load

- c. Change to the folder (directory) where you downloaded the template(s) and select the template for your modem model and/or preferred mode.

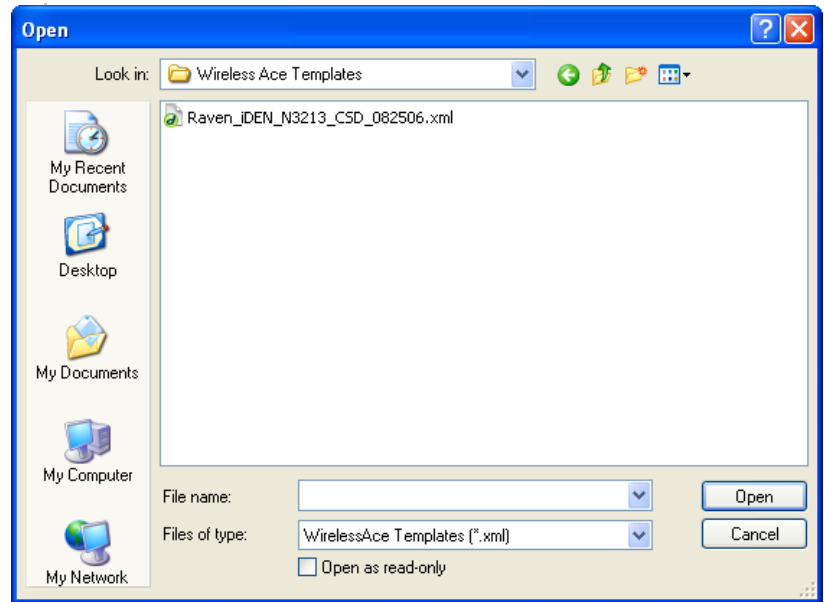


Figure 2-15: AceManager : Template

9. Configure additional PassThru settings.

- a. On the left, under the GROUPS heading, select *PassThru*.

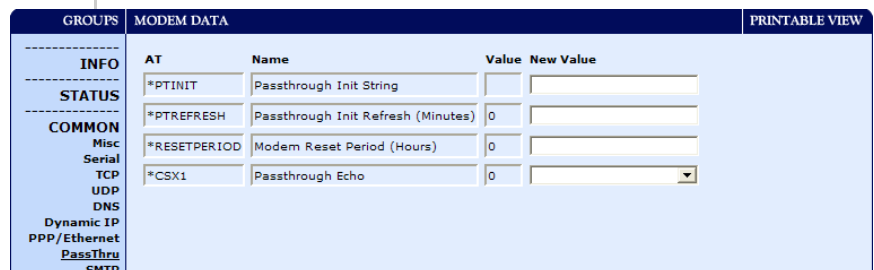


Figure 2-16: AceManager : PassThru

- b. For *PTREFRESH, enter a value of 15.
- c. For *RESETPERIOD, enter a value of 6.

10. Save the configuration settings.

Click the *Write* button on the tool bar of AceManager and wait for the message "Write Successful" to appear in the status bar.

11. Configure the Raven for your equipment.

- a. Make any appropriate changes to the serial port parameters to match your equipment. These changes are made under the group *Serial*.

Caution: *Do not under any circumstances change the *MODEMHSPEED setting from the template configuration, the only recommended setting to change is the S23 setting.*

- b. Follow the directions above to Write the changes to the modem.

12. Reset the Raven.

- a. Click the *Disconnect* button.
- b. Press the modem *Reset* button on the front of the modem.
- c. Wait until the modem *REG* indicator is lit.
- d. Disconnect the Raven from your computer.

13. Test the Raven Configuration.

Once the modem has been activated and you've built the command string it is recommended that the Raven modem be tested previous to field installation.

- a. Verify that the modem Chan, Link and Reg indicators are blinking in unison confirming that the modem is now operating in circuit switched (IS-95) mode.
- b. Using a terminal emulation program (HyperTerminal) set up for 9600bps, 8 data bits, no parity and 1 stop bit, verify the settings in the Raven.
 1. Enter the command: AT. If you do not receive a reply of "OK", enter ATE1 to enable the echo mode.
 2. Enter the command: AT&V
 3. Review the settings and confirm that the parameters are correct: +WS45=0, +WS46=23, and +FCLASS=0. You may need to backscroll the display to see the parameters.

```

Raven iDEN - HyperTerminal
File Edit View Call Transfer Help
at&v
Active User Image: 2
E1 00 V1 X4 8C1 8D2 8K3
S0:001 S2:043 S3:013 S4:010 S5:008 S6:010
S7:120 S8:002 S9:006 S10:014 S12:050 S30:000
+IFC : 2,2 : Flow Control
+ICF : 0,0 : Character Framing
+WVCLASS : 9 : Service Class
+WS45 : 0 : DTE-Side Stack
+WS46 : 23 : WDS-Side Stack

Packet Data Parameters
+WV300 : 1 : Mobile IP Activation
+WV302 : 64800 : Mobile IP Registration Lifetime
+WV309 : 257 : Security Parameter Index
+WV305 : "170.206.45.149" : Home Agent IP Address
+WV311 : 24 : +WPNEI Prefix Length
+WV310 : 0 : Request Broadcast Datagrams
+WV304 : "10.23.6.1" : DCE IP Address
+WPNEI : "72.6.119.13" : DTE IP Address
+WV308 : 0,0,40 : Data Encryption
+WS196 : 0 : Data Compression
+WS182 : 2 : Header Compression
OK
Connected 0:03:24 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

```

Figure 2-17: HyperTerminal

Note: The dial test should be completed with the serial cable disconnected to verify that no signaling is required by the modem.

4. Enter the command: **AT+WVCLASS?**. Confirm that a response of "+WVCLASS: 9" is returned.
 5. Enter the command: **ATS0?**. Confirm that a response of "001" is returned.
- c. Dial the Raven modem telephone number from a land line and verify that the modem automatically answers the call with modem tones.
 - d. Verify outgoing calls.
 1. Connect the modem to your computer with a serial cable. Using a terminal emulation program (HyperTerminal) set up for 9600bps, 8 data bits, no parity and 1 stop bit.
 2. Enter the command: **ATD[phone number]**. For the [phone number], enter a known phone number including the area code for which you can hear ring (such as your office phone).

14. Commission the Raven Modem on Site.

The following steps represent a guideline and makes assumptions that the modem has been verified previously in a controlled environment.

- a. Install the Raven modem verifying that all power and antenna cables are correctly secured.

- b.** Verify that the Raven modem powers up and that the Chan, Link and Reg lights blink in unison.
- c.** Connect the Raven modem to the laptop computer via a straight through RS232 cable or connect the serial cable from the modem to a USB to serial device that has been previously installed on the laptop.
- d.** Remove the connection to the Laptop PC and connect your equipment to the Raven Modem.
- e.** Have the actual application call your equipment via the modem telephone number and verify communications.

>> C: Windows Dial-up Networking (DUN)

- Installing a modem driver for Raven
- Creating a Dial-Up Networking (PPP) Connection
- Connecting to the Internet Using DUN

Dial-up Networking (DUN) allows a computer or other device to use the serial port on your Raven to connect to the Internet or private network using PPP just like an analog modem using a standard phone line.

Caution: *To install any driver on your computer, you may need to be logged in as Administrator or have Administrator privileges for your login.*

Microsoft Windows XP is used in the examples below. The modem driver installation and DUN setup and configuration is similar in Microsoft Windows products. Examples are not provided here for installing the driver or configuring DUN for any other operating system.

Installing a modem driver for Raven

Standard installations of Microsoft Windows XP and 2000 include a generic modem driver which will work with your Raven.

1. Connect the Raven.

- a. Connect the modem to the computer with a DB-9 cable or the USB port in serial mode. .
- b. Plug in the AC adapter, connect the antenna(s) and power on the modem.

2. Install the driver.

- a. Select *Start > Control Panel > Phone and Modem Options* (in Classic View).

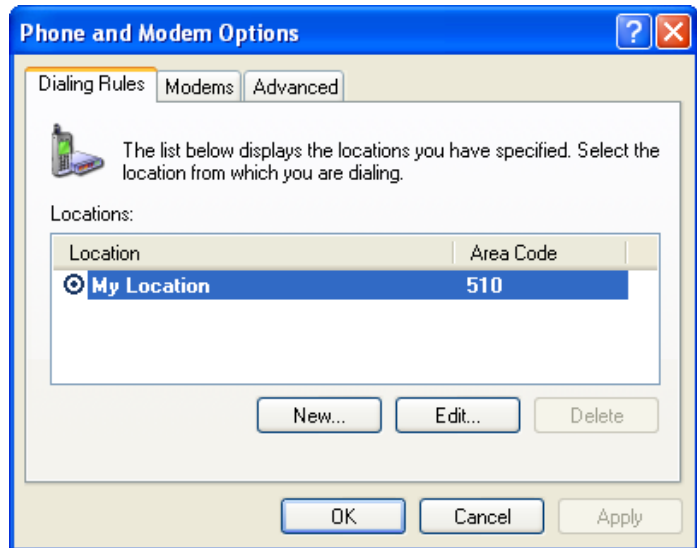


Figure 3-1: Phone and Modem Options

- b.** Select the *Modems* tab.

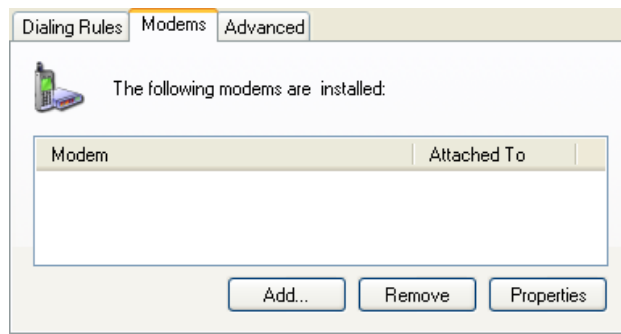


Figure 3-2: Phone and Modem Options: Modems

- c.** Select *Add*.

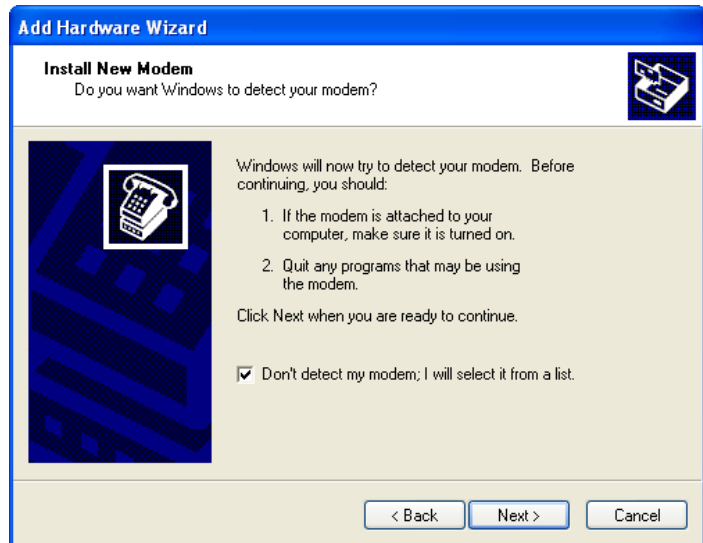


Figure 3-3: Add Hardware Wizard

- d. Check *Don't detect my modem; I will select it from a list.*
- e. Select *Next*.

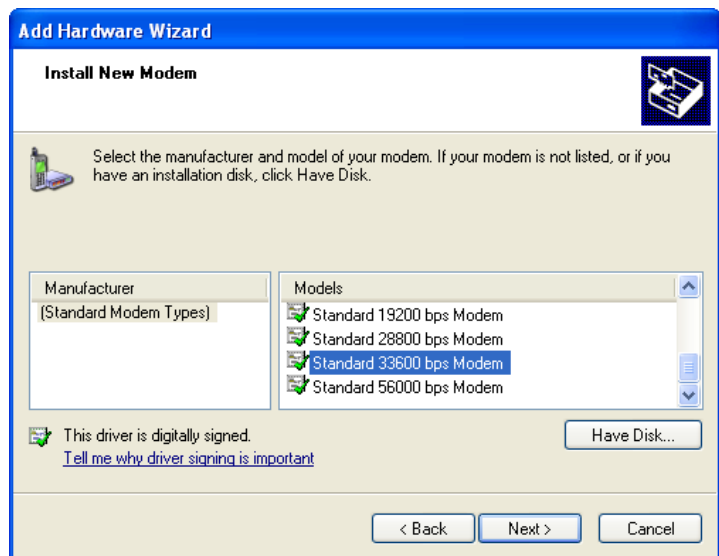


Figure 3-4: Add Hardware Wizard: Install New Modem

- f. Select *(Standard Modem Types)* from the Manufacturers column.
- g. Select *Standard 33600 bps Modem* from the Models column.

Tip: If you have the speed for your modem configured as something other than the default, use the Standard Modem that matches the speed you configured.

h. Select *Next*.

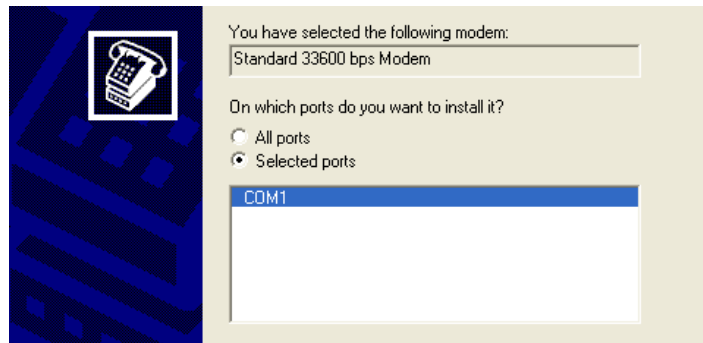


Figure 3-5: Add Hardware Wizard: Select Ports

i. Check *Selected Ports*

j. Select the COM port the modem is connected to (commonly COM1).

k. Select *Next*.



Figure 3-6: Add Hardware Wizard: Finish

l. Once the modem driver is installed, select *Finish*.

3. Configure the driver.

When you return to the *Phone and Modem Options* window, you should see the newly installed modem “attached to” the correct COM port.

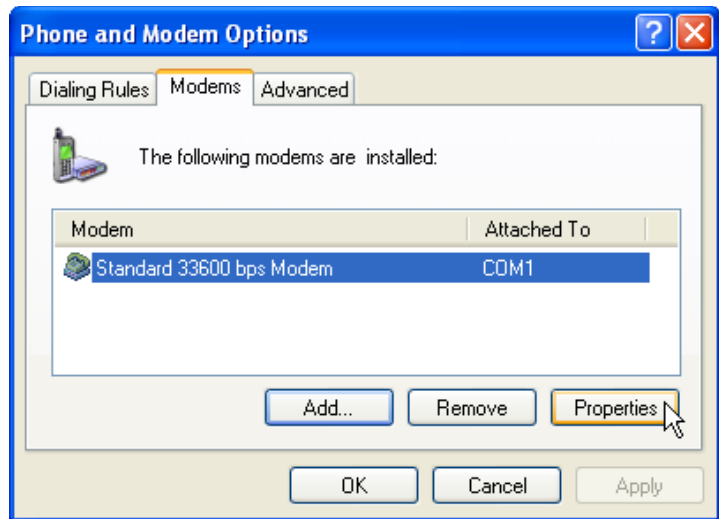


Figure 3-7: *Phone and Modem Options: Modems*

- a. Highlight the modem and select *Properties*.

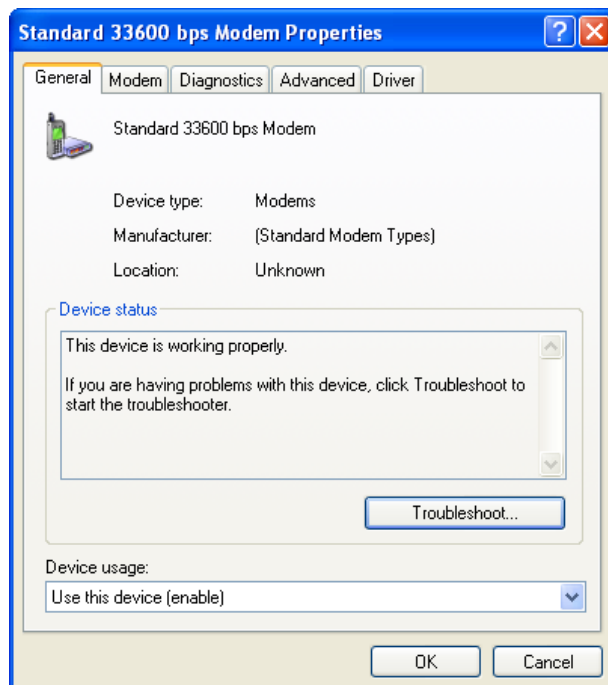


Figure 3-8: *Modem Properties*

- b.** Select the *Modem* tab.

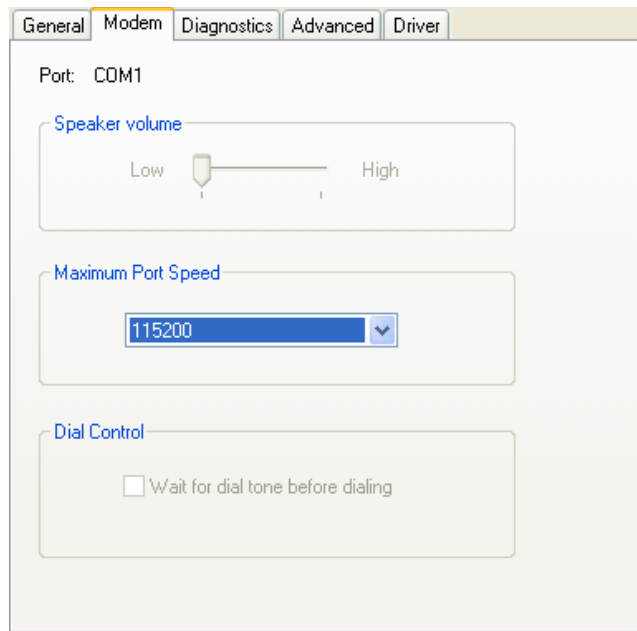


Figure 3-9: *Modem Properties: Modem*

- c.** Maximum Port Speed should be set to 115200 (default).
- d.** Select OK to exit.
- e.** Select OK again to exit out of the Phone and Modem Options.

Creating a Dial-Up Networking (PPP) Connection

Once you have the driver for the modem installed on your computer, you can set up and configure Dial Up Networking (DUN) to use the modem as your connection to the Internet using PPP.

Note: No other device or program can be using the same COM port (serial port) configured for the modem driver.

Caution: *If you have an existing LAN connection, installing DUN for the modem may interfere with the LAN connection. It's recommended to disconnect your LAN connection before using a PPP connection with your Raven.*

Once the DUN connection is initiated, by default, it will take over as the “default route” for network communication and specifically for Internet access. If you want the two connections to co-exist, you will need to de-select “Use default gateway on remote network” (described later) and use the route command in Windows to setup routing through the modem properly. This guide does not provide information on the route command. You may need to consult with your network administrator to properly configure routing.

1. Create a new network connection.

- a. Select *Start > Connect To > Show All Connections* to open the Network Connections window.

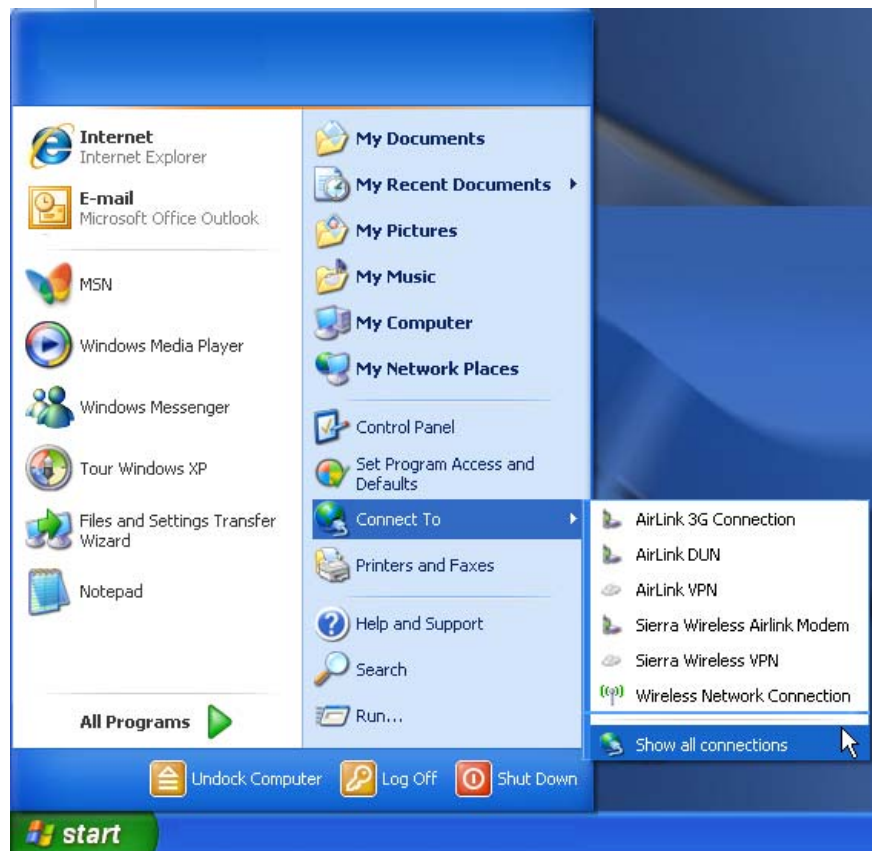


Figure 3-10: Windows : Start menu

- b.** Select *Create a New Connection* under Network Tasks in the menu area on the left.

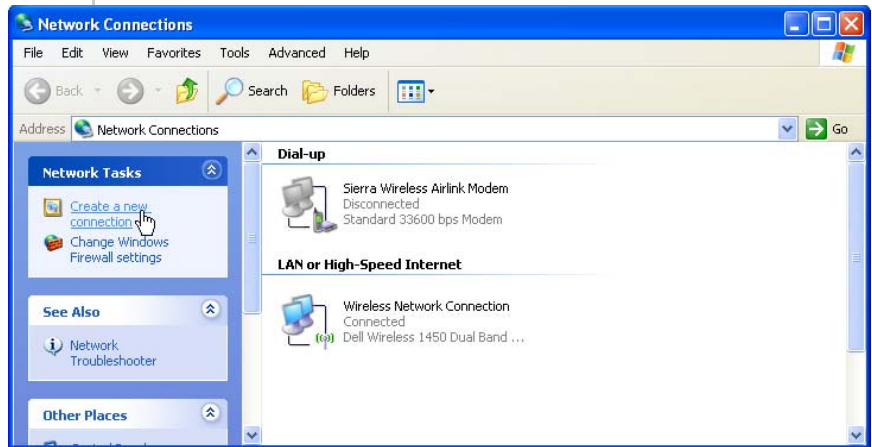


Figure 3-11: Create New Connection

- c.** Select *Next* to start installing and configuring the DUN connection.



Figure 3-12: New Connection Wizard

- d.** Select *Connect to the Internet*.
- e.** Select *Next*.

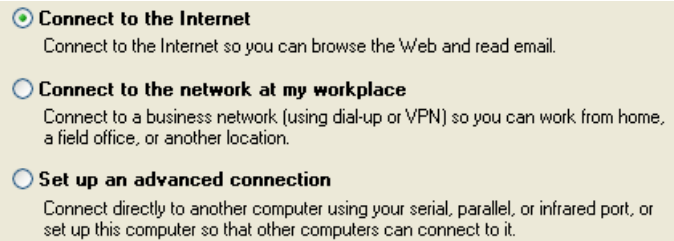
- 
- ☒ **Connect to the Internet**
Connect to the Internet so you can browse the Web and read email.
 - ☐ **Connect to the network at my workplace**
Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
 - ☐ **Set up an advanced connection**
Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.

Figure 3-13: New Connection: Type

- f.** Select *Set up my connection manually*.
- g.** Select *Next*.

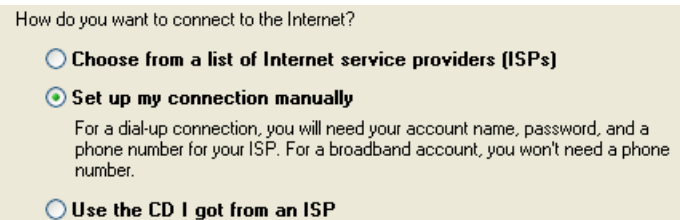
- 
- How do you want to connect to the Internet?
- ☐ **Choose from a list of Internet service providers (ISPs)**
 - ☒ **Set up my connection manually**
For a dial-up connection, you will need your account name, password, and a phone number for your ISP. For a broadband account, you won't need a phone number.
 - ☐ **Use the CD I got from an ISP**

Figure 3-14: New Connection: How do you want to connect?

- h.** Select *Connect using a dial-up modem*.
- i.** Select *Next*.

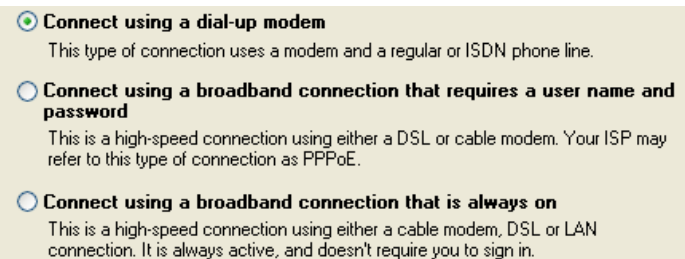
- 
- ☒ **Connect using a dial-up modem**
This type of connection uses a modem and a regular or ISDN phone line.
 - ☐ **Connect using a broadband connection that requires a user name and password**
This is a high-speed connection using either a DSL or cable modem. Your ISP may refer to this type of connection as PPPoE.
 - ☐ **Connect using a broadband connection that is always on**
This is a high-speed connection using either a cable modem, DSL or LAN connection. It is always active, and doesn't require you to sign in.

Figure 3-15: New Connection: Connect using...

- j.** *Optional:* If you have multiple modems installed on your computer, you may be prompted to select the modem to be used. If you only have one modem installed, this option will be omitted.
- k.** Check *Standard 33600 bps Modem*.
- l.** Select *Next*.

You have more than one dial-up device on your computer.

Select the devices to use in this connection:

<input type="checkbox"/>	Modem - BCM V.92 56K Modem (COM3)
<input checked="" type="checkbox"/>	Modem - Standard 33600 bps Modem (COM1)

Figure 3-16: New Connection: Select Modem

- m.** Type in a name for the connection, such as *Sierra Wireless AirLink Modem*.
- n.** Select *Next*.

Type the name of your ISP in the following box.

ISP Name

Sierra Wireless Airlink Modem

The name you type here will be the name of the connection you are creating.

Figure 3-17: New Connection: Connection Name

Tip: The name provided here will not effect the connection in any way. It is only a label for the icon. It can be the name of your wireless service provider (Provider), your modem (Raven), or any other designation for the connection.

- o.** Type in *10001* as the phone number for the modem to dial.
- p.** Select *Next*.

Type the phone number below.

Phone number:

10001

You might need to include a "1" or the area code, or both. If you are not sure you need the extra numbers, dial the phone number on your telephone. If you hear a modem sound, the number dialed is correct.

Figure 3-18: New Connection: Phone Number

- q.** *Optional:* If you have multiple users configured for your computer, you may be prompted for Connection Availability. If you select *My use only*, the account currently logged on will be the only one able to use this DUN connection.
- r.** Select *Next*.

A connection that is created for your use only is saved in your user account and is not available unless you are logged on.

Create this connection for:

- ☒ Anyone's use
☐ My use only

Figure 3-19: New Connection: Permissions

Generally the modem takes care of the Account Information, User name and Password, for the connection, so you can leave the fields blank (unless otherwise instructed by Support).

- s. If you want to allow others to use the same login for the modem, select *Use this account name and password....*
- t. Select *Next*.

Type an ISP account name and password, then write down this information and store it in a safe place. (If you have forgotten an existing account name or password, contact your ISP.)

User name:

Password:

Confirm password:

☒ Use this account name and password when anyone connects to the Internet from this computer

☐ Make this the default Internet connection

Figure 3-20: New Connection: Connection Information

Caution: If you have a LAN connection to the Internet and select *Make this the default Internet Connection* for the DUN configuration, you will not be able to use the LAN to connect to the Internet and may also affect the network connection on your computer to the rest of the LAN. Select this option *ONLY* if the Raven will be your sole network connection.

- u. If you want to add a shortcut for this DUN connection to your desktop, check *Add a shortcut*.
- v. Select *Finish* to exit the Network Connection Wizard.

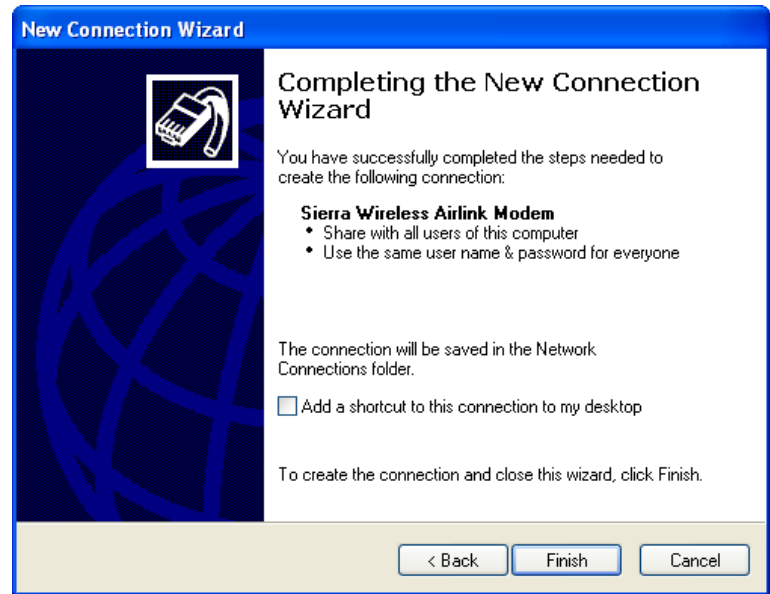


Figure 3-21: New Connection: Finish

2. Configure the DUN connection

After you complete the New Connection Wizard, there are a few more things you will want to configure in the connection.

- a. Select *Properties*.

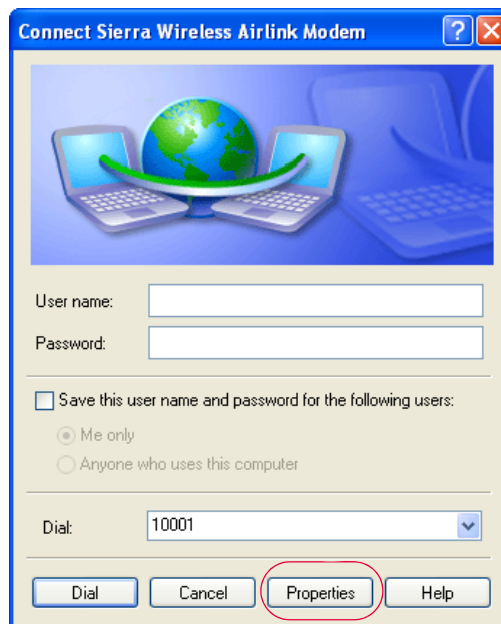


Figure 3-22: DUN Connection

- b. Uncheck *Use dialing rules*.

- c. Check *Show icon...when connected*.
- d. Select *Configure*, below the Connect using line.

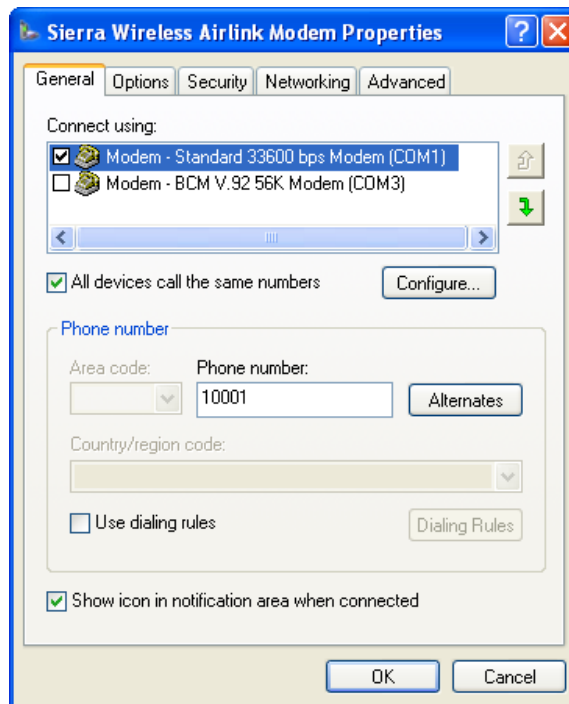


Figure 3-23: DUN Properties

- e. Select 115200 as the Maximum speed.
- f. Check *Enable hardware flow control*.
- g. Do not check any other option.
- h. Select OK.

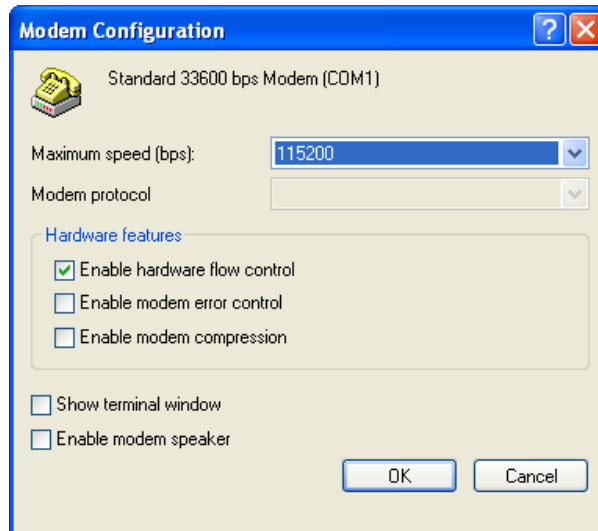


Figure 3-24: Modem Configuration

- i. Back at the main properties screen, select the *Networking* tab.

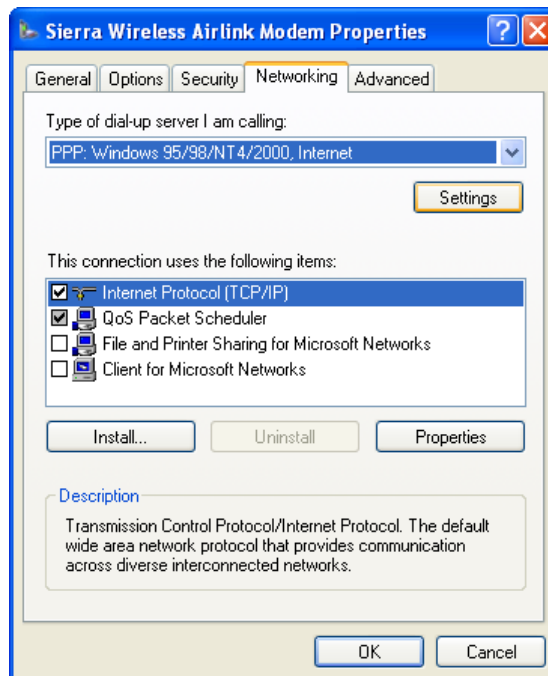


Figure 3-25: Networking

- j. Select *Settings*.
- k. Remove the checks from all three PPP settings.
- l. Select *OK*.

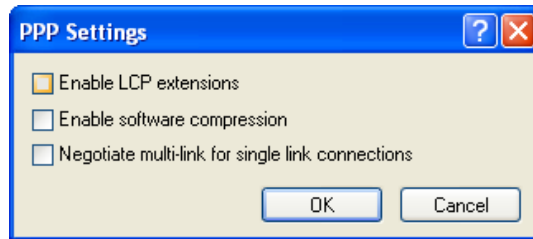


Figure 3-26: PPP Settings

- m. Select (highlight) Internet Protocol (TCP/IP) and then select *Properties*.

Tip: For most configurations, you will be obtaining the IP address and the DNS server address automatically.

- n. Select *Advanced*.

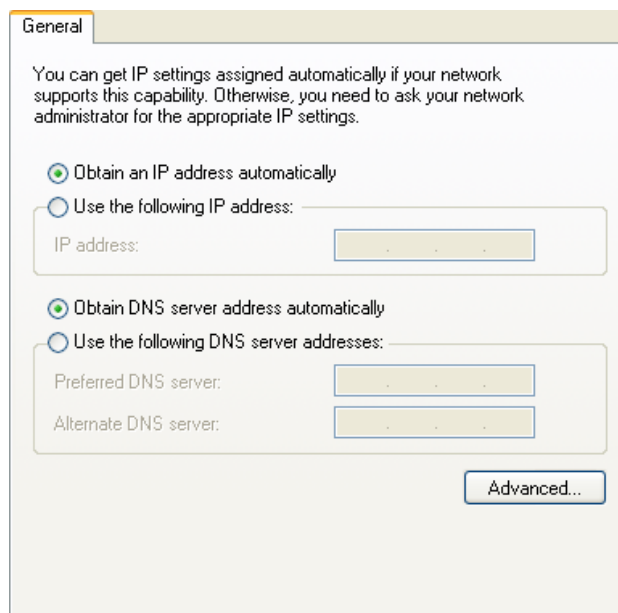


Figure 3-27: TCP/IP Properties

- o. Uncheck *Use IP header compression*.
- p. Check *Use default gateway on remote network*.
- q. Select *OK*.

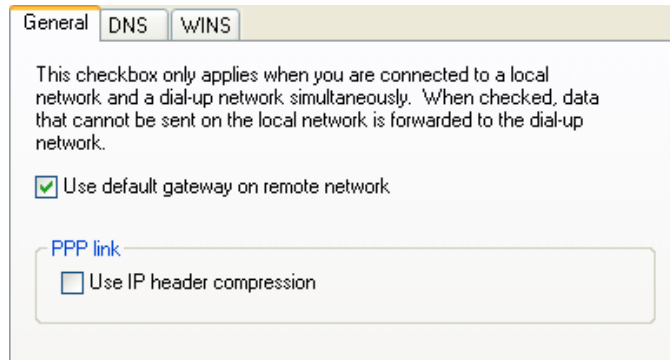


Figure 3-28: Advanced TCP/IP

Tip: You may want to check the *Options* tab and change the settings for applications you might be using. The default options are generally applicable for most uses.

Caution: Unless specifically directed to do so by Support or your network administrator, you do not need to make any changes to the options on the *Security* tab.

- r. Select OK until you return to the *Connect* window.

Connecting to the Internet Using DUN

There are two methods you can use to connect with Raven to the Internet using DUN, AceView and the Windows DUN connection directly.

AceView

AceView is a small utility which can maintain your DUN connection and monitor the connection of your Raven to Provider. If you have not already installed AceView you can obtain the most recent version from the Sierra Wireless Airlink website.

This guide assumes you have a default installation of AceView.

1. Start AceView.

Start > All Programs > AirLink Communications > AceView

Note: The direct DUN connection features of AceView are not available in Windows 98 or Windows NT.

2. Enable the Connection.

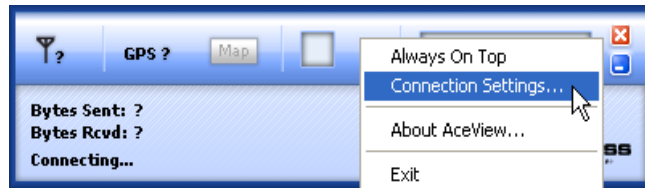


Figure 3-29: AceView: Menu

- a. Right-click on the AceView window to open the menu.
- b. Select *Connection Settings*.

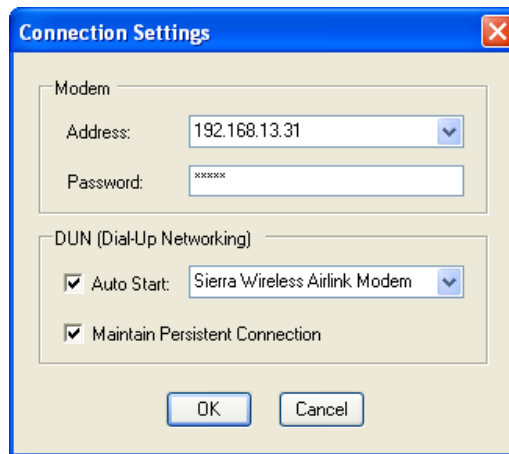


Figure 3-30: AceView: Connection Settings

- c. Select *Auto Start* in the DUN section.
- d. Select *Maintain Persistent Connection*.

When checked, AceView will continually check the DUN connection to ensure it is not down. If so, AceView will attempt to connect again.

Tip: When using the DUN connection, make sure the IP Address is set to the local IP address of the modem, 192.168.13.31 by default.

- e. Select *OK*.
- f. *OK*.

Windows DUN

You can directly use the Dial-up link for the DUN connection.

1. Start the DUN session.

Start > Connect To > Sierra Wireless Airlink Modem

If you named the connection differently, use the name of the PPP connection you made earlier.



Figure 3-31: DUN Connection

Tip: Generally you will not need to enter a Username or Password. If you do need to enter either, you can enter these parameters beforehand using *NETUID and *NETPW.

2. Select Dial to connect to the modem and the cellular network.

Note: The speed shown in the connection is the speed between the modem and your computer, it is not the speed of the modem's connection to Provider or the Internet.

When you're connected, an icon should appear in the system tray showing the connection status.

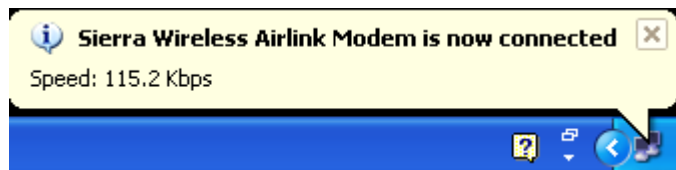


Figure 3-32: Connection indicator

Caution: *For DUN connections on a Windows Mobility or other non-personal computer, the DNS settings may not be configured with the DUN connection. You may need to go into the network settings and add DNS servers manually.*

